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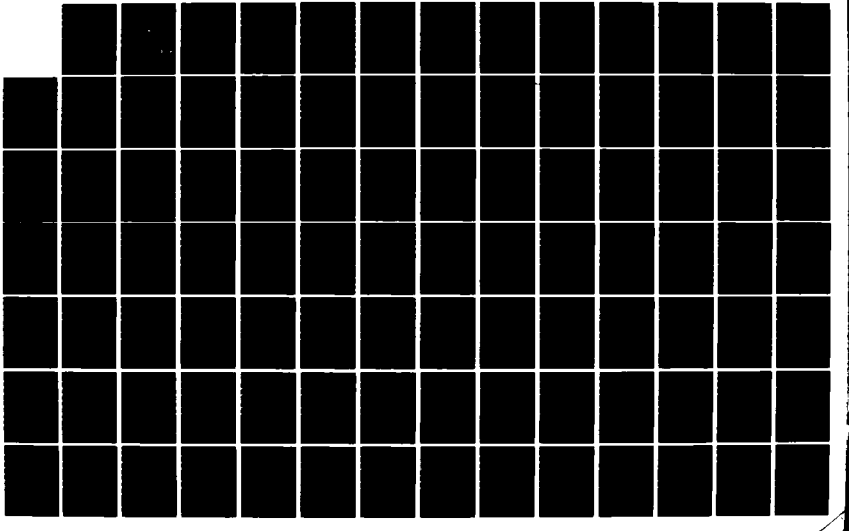

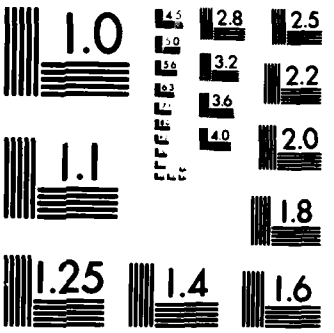

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NAVAL POSTGRADUATE SCHOOL

Monterey, California

AD-A150 779

THESIS

EASYPLOT:AN INTERACTIVE,
USER-FRIENDLY GRAPHICS PROGRAM

by

John C. Mainwaring

September 1984

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Thesis Advisor: Robert E. Ball

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This thesis is an interactive Fortran program called Easyplot which allows a person to quickly access the NPS IBM 3033 graphics capabilities to produce a professional graph. No programming is required on the part of the user. Easyplot systematically asks the user questions, the responses to which are utilized by the Disspla software system to output two and

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three dimensional graphs. This program is available to any Naval Postgraduate School computer user.

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Easyplot: An Interactive, User-Friendly Graphics Program

by

John C. Mainwaring
Captain, United States Army
B.S., United States Military Academy, 1974

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN AERONAUTICAL ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL
September 1984

Author: _____

Approved by: _____
Thesis Advisor

_____
Chairman, Department of Aeronautics

_____
Dean of Science and Engineering

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I. INTRODUCTION

A. BACKGROUND

The ability to clearly present data in some kind of easily interpreted, visual manner is of considerable importance within an educational-research environment such as the Naval Postgraduate School. In nearly all of the various departments, graphic representation of data is constantly employed as a means to illustrate and communicate significant findings. The digital computer is a potentially valuable aide in providing this graphic representation. Its capability to output data in a high-quality, publishable format can greatly enhance the clarity and visual appeal of the overall publication in which the graph appears. Prior to the completion of this project, however, only those individuals possessing the programming knowledge and the time to actually write a specific Fortran program for the graphic display of their data could take advantage of this capability. The need for a quick and easy method of inputting a graph's parameters and data into the computer was determined by the author to be a significant one for the students and faculty comprising this academic community. Such a method would eliminate the need for extensive programming time and skill and would allow a greater portion of the community to make use of the computer's graphics capability.

A graphics package developed by ISSCO graphics software (referred to as Disspla) was purchased by the Naval Postgraduate School to be used for graphic display in conjunction with a variety of programming schemes. However, there seemed to be a lack of a knowledge base in the use of Disspla, and few programs existed that employed the system. An interactive and user-friendly program in which the user

is sequentially stepped through the graph development process seemed to best meet the perceived need for a quick and easy method of inputting graph data. Such a program would eliminate the need for programming skill, would reduce the time required to obtain a graph, and would allow anyone the opportunity to develop a high-quality graphic display of his data. In addition, it would have the intrinsic benefit of illustrating the sequence and information requirements of Disspla, perhaps stimulating interest in future program use of Disspla as a vehicle for putting data in graphical form.

B. GCALS

The objective of this program was to develop an interactive user-friendly capability for any individual using the IBM 3033 computer for the purpose of graphic display. The name of the program is Easyplot. In order to maximize the assets available at the Naval Postgraduate School, Easyplot was designed for use in conjunction with any graphics terminal capable of direct tie-in to the IBM 3033. When used with Disspla, it is capable of providing the guidance needed for the user to develop a graphic representation of his/her data. The types of graphs available for data display are two-dimensional (standard, semi-log, log-log) and three-dimensional (standard). Graph correction and alteration are possible with a minimum of effort. The program was designed for the use of anyone wishing to make high-quality graphs quickly and easily, with no programming involved.

II. APPROACH TO THE PROBLEM

The basic approach was to write a single computer program utilizing the ISSCO software system, Dissp1a, in Fortran IV for use on the IBM 3033. The program consists of a series of separate subroutines for each phase of graph development. These subroutines are then called in a logical sequence, guiding the user through the design process to produce the desired graph. The program is completely interactive. It prompts the user for all the necessary information to depict the user's data in the form of two- or three-dimensional graphs on any of the graphical devices which can be connected to the IBM 3033. The user is given the option of either inputting the curve data at the terminal or entering the stored curve data from a file. A help menu is provided for definition and clarification of terms. Once the user has achieved the desired form for his graph, an electrostatic copy or a Versatec plot can easily be made. Due to the interactive nature of the program, detailed knowledge of Dissp1a programming requirements is not necessary on the part of the user. However, prior user preparation in terms of complete data and final desired graph form is helpful for quick execution of the program.

III. SOLUTION TO THE PROBLEM

A working knowledge of Disspla and the method for its use in a Fortran program was necessary prior to beginning the task of designing the program. Once that was obtained, the first requirement was that each phase of the graph development process be compartmentalized into separate subroutines. The second requirement was that each subroutine direct questions to the user, elicit responses, verify that the responses fall within established parameters and then condition the responses for proper use by Disspla. The third requirement was that the calls for each subroutine be logically sequenced in an order which would step the user through the design of a graph. Once all the user's responses to the subroutine questions were collected and the locations of the data determined, the fourth requirement was that a visual display of the user's graph be shown. With this visual picture before the user, the editing phase could be entered. The fifth requirement was that the editing phase also be compartmentalized utilizing as many of the initial subroutines as possible. The user could then make as many corrections and/or changes as needed on his graph, displaying the updated version as often as required. The final requirement was that the completed graph be either stored for later reference (optional) and/or produced in hard copy on any of the various output devices available.

IV. RESULTS AND CONCLUSIONS

This program has been very effective in meeting the need of the Naval Postgraduate School community for a quick and easy method of creating computer-generated graphs. Constant feedback from program users during an extensive testing phase allowed for correction of all problems and incorporation of many recommendations. In final form, the program has a high degree of flexibility while remaining simple to use. Its continued widespread use among students beyond the testing phase and its active promotion by the computer center staff attest to its acceptance as a viable interactive graphics system. The quality of its output in two- and three-dimensional graphic format is excellent (see Appendix C). The time required for graphic production is minimal when compared to the time required for writing a separate and complete program for each desired graph.

The capability of the program could be enhanced in several ways. First, an improved method of filing the graphics data would lessen the amount of space taken on the user's A disk. Second, the choice of having more than one subplot area on a page could be added to allow for dual scales, graphs, etc. Third, the three-dimensional portion of the program could be expanded to include semi-log, log-log, and the ability to alter the perspective of viewing the graph.

APPENDIX A

USERS GUIDE TO THE EASYPLOT PROGRAM.

This program has been written with the user in mind. It is completely interactive and once the program has been loaded the user need only answer the questions presented to him.

Use the following procedure to invoke Easyplot:

1. Logon any IBM 3033 terminal.
2. Obtain the use of temporary storage space by entering the following:

   DEFINE STORAGE 1M (ENTER)

3. When PSW '00020000 00000000' appears on the screen type in:

   I CMS (ENTER)

4. At this point you are ready to start, type in:

   EASYPLOT (ENTER)

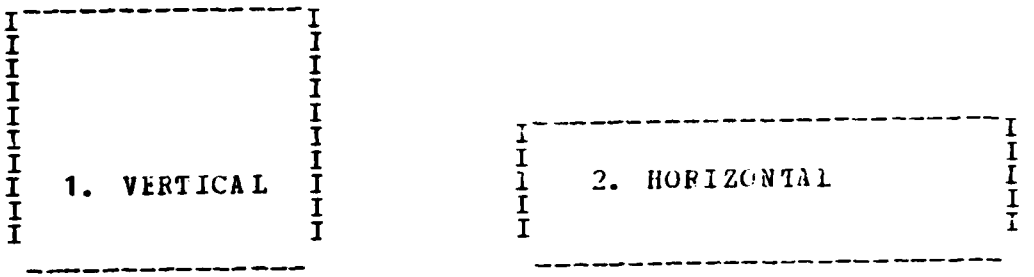
5. Follow the instructions given using the example graphs provided as a guide to input the appropriate graph data.

```
LOGON and define storage 1m (enter)

CP ENTERED; DISABLED WAIT PSW '00020000 00000000'

I CMS (ENTER)

CMS SE VERSION 1.0 - 12/29/82

easyplot (ENTER)

B (120) R/O
C (121) R/O
EXECUTION BEGINS...

          **** MESSAGE TO USER ****
     A. SIMPLY ANSWER THE QUESTIONS AS PRESENTED!
     B. ANY ERRORS MADE MAY BE CORRECTED LATER DURING EDITING.
     C. TO USE YOUR OWN FILES FOR CURVE DATA INPUT, YOU MUST HAVE
        A FIXED FILE, 80 CHARACTERS IN LENGTH WITH A SPACE OR COMMA
        BETWEEN VALUES.
     D. TO EXIT FROM THIS PROGRAM, ANSWER ANY QUESTION WITH -99.99.

        **** DO YOU WISH TO CONTINUE WITH THIS PROGRAM? (Y OR N)
y (ENTER)

     WHICH TYPE GRAPH DO YOU WISH TO DEVELOP?

     1. TWO-DIMENSIONAL GRAPH WITH STANDARD AXES
     2. TWO-DIMENSIONAL SEMI-LOG GRAPH, WITH X AS THE LOG AXIS
     3. TWO-DIMENSIONAL SEMI-LOG GRAPH, WITH Y AS THE LOG AXIS
     4. TWO-DIMENSIONAL LOG-LOG GRAPH
     5. THREE-DIMENSIONAL GRAPH WITH STANDARD AXES
?
1 (ENTER)

     WHICH GRAPHICS DEVICE ARE YOU GOING TO BE USING?
          1. TEK618, IBM 3277/TEC 618 DUAL-SCREEN
          2. TEKTRONIX, ANY MODEL
          3. COMPRS, USED WITH DISSPOP
          4. PRTFIT, USED WITH IBM 3278 TERMINAL, OUTPUT FROM THIS
             DEVICE IS TRASH, BUT IT ALLOWS YOU TO INPUT A GRAPH,
             AND SAVE IT FOR LATER USE WITH A GRAPHICS TERMINAL.
          5. IBM79, IBM 3279/COLOR IBM TERMINAL.
?
1 (ENTER)
>> USING A PRE-ALLOCATED DATASET FOR UNIT FT17F001.
```

IS THIS AN UPDATE OF AN OLD GRAPH? (Y OR N)

n (ENTER)

WHICH DIRECTION OF THE PAGE DO YOU DESIRE? (1 OR 2)



?
1 (ENTER)

DO YOU WANT AN EXAMPLE GRAPH TO LOOK AT? (Y OR N)

y (ENTER)

(see Figure C.1)

****LOCK AT THE DISPLAY SCREEN****
ANSWER THE FOLLOWING QUESTIONS USING THE DISPLAY
AS REFERENCE. BOTH AXES ARE MARKED IN INCHES.
THE NORMAL PAGE SIZE IS EITHER (X BY Y):
8.5 X 11.0 FOR A VERTICAL PAGE
11.0 X 8.5 FOR A HORIZONTAL PAGE

DO YOU WISH TO CHANGE THE PAGE SIZE FROM THE ONE SHOWN? (Y OR N)

n (ENTER)

DISSPLA WILL POSITION THE PLOT ON THE PAGE.
(ONE INCH BORDER IS NORMAL)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 6.00

WHAT IS THE LENGTH OF THE X-AXIS IN INCHES?

?
6 (ENTER)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 8.00

WHAT IS THE LENGTH OF THE Y-AXIS IN INCHES?

?
8 (ENTER)

WHAT IS THE TITLE OF THIS GRAPH?
(32 CHARACTERS MAX)

helicopter design (ENTER)

WHAT IS THE NAME OF THE X-AXIS?
(32 CHARACTERS MAX)

main rotor speed (rpm) (ENTER)

WHAT IS THE NAME OF THE Y-AXIS?
(32 CHARACTERS MAX)

load weight (lb) (ENTER)

DO YOU WISH TO HAVE A MESSAGE FOR THIS GRAPH? (Y OR N)
(I.E. SUBTITLE, FIGURE #, COMMENT,...)

y (ENTER)

WHAT IS THE MESSAGE? (32 CHARACTERS MAX)

figure 1 (ENTER)

THE FOLLOWING QUESTIONS DETERMINE THE LOCATION OF THE MESSAGE
IN RELATION TO THE AXES ORIGIN.

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 5.00

WHAT IS THE X-LOCATION IN INCHES OF THE MESSAGE?

?
5 (ENTER)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS -0.70

WHAT IS THE Y-LOCATION IN INCHES OF THE MESSAGE?

?
-.7 (ENTER)

DO YOU WISH TO HAVE A LEGEND FOR THIS GRAPH?
(Y OR N)

y (ENTER)

THE FOLLOWING QUESTIONS DETERMINE THE LOCATION OF THE LOWER
LEFT CORNER OF THE LEGEND:
** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 3.00

WHAT IS THE X-POINT IN INCHES OF THIS CORNER?

?
3 (ENTER)

```
        ** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS   1.00
        WHAT IS THE Y-POINT IN INCHES OF THIS CORNER?
?
5 (ENTER)
        THE FOLLOWING QUESTIONS DETERMINE THE SCALE OF THE X-AXIS:
        ** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS   0.0
             WHAT IS THE VALUE OF X AT THE ORIGIN? (LEFT SIDE)
?
0 (ENTER)
        ** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS   1.00000
             WHAT IS THE X STEP INTERVAL IN YOUR UNITS?
?
100 (ENTER)
        ** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS   6.00000
             WHAT IS THE MAXIMUM VALUE OF THE X-AXIS? (RIGHT SIDE)
                  (ANSWER TO THIS QUESTION IS NOT USED FOR LOG AXIS)
?
500 (ENTER)
             WHICH TYPE OF NUMBERS DO YOU WANT ON THE X-AXIS?
                  1. REAL NUMBERS (I.E. 20.0)
                  2. INTEGER NUMBERS (I.E. 20)
?
1 (ENTER)
        THE FOLLOWING QUESTIONS DETERMINE THE SCALE OF THE Y-AXIS:
        ** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS   0.0
             WHAT IS THE VALUE OF Y AT THE ORIGIN? (BOTTOM CORNER)
?
0 (ENTER)
        ** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS   1.00000
             WHAT IS THE Y STEP INTERVAL IN YOUR UNITS?
?
5 (ENTER)
```

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 8.00000

WHAT IS THE MAXIMUM VALUE OF THE Y-AXIS? (TOP CORNER)
(ANSWER TO THIS QUESTION IS NOT USED FOR LOG AXIS)

?
25 (ENTER)

WHICH TYPE OF NUMBERS DO YOU WANT ON THE Y-AXIS?
1. REAL NUMBERS (I.E. 20.0)
2. INTEGER NUMBERS (I.E. 20)

?
2 (ENTER)

THE FOLLOWING QUESTIONS PERTAIN TO THE GRID SYSTEM

DO YOU WANT THE GRAPH TO HAVE GRID LINES? (Y OR N)

y (ENTER)

HOW MANY GRID LINES PER X-AXIS STEP INTERVAL?

?
1 (ENTER)

HOW MANY GRID LINES PER Y-AXIS STEP INTERVAL?

?
2 (ENTER)

WHICH LINE PATTERN DO YOU DESIRE?
1. LINE, _____
2. DOT, ...
3. DASH, - - - - -
4. CHNDOT, ____.__.____.__.____.__.
5. CHNDSH, ____ __ ____ __ ____ __

?
2 (ENTER)

HOW MANY CURVES DO YOU WISH TO PLOT? (0 THRU 18)

?
1 (ENTER)

WHAT IS THE NAME OF CURVE 1?
(32 CHARACTERS MAX)

uh-1 (ENTER)

```
        WHICH LINE PATTERN DO YOU DESIRE?
             1. LINE,    ----------------------
             2. DOT,     ......................
             3. DASH,    ----------  ----------
             4. CHNDOT,  ----  .  ----  .  ----
             5. CHNDSH,  ----  --  ----  --  ----
?
1 (ENTER)

        WHICH METHOD DO YOU WISH TO USE TO INPUT DATA FOR THIS CURVE?
             1. TYPE IN DATA ONE PAIR AT A TIME.
             2. USE DATA FILE INPUT.
?
1 (ENTER)

        HOW MANY POINTS DO YOU WISH TO PLOT ON THIS CURVE? (100 MAX)
?
5 (ENTER)

                              MARKER SYMBOL INFORMATION

      A POSITIVE NUMBER--POINTS WILL BE CONNECTED AND MARKER SYMBOLS DESIGNATED
                        (*--------*--------*--------*--------*)
      ZERO (0)--POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.
                        (------------------------------------)
      A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBOLS ONLY.
                        (*        *        *        *        *)

        EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND CONNECTED
                     BY A LINE)

   HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DISPLAYED?
?
1 (ENTER)

        X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
           POINT   1 OF   5 POINTS.
?
499,1 (ENTER)

        X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
           POINT   2 OF   5 POINTS.
?
400,3 (ENTER)

        X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
           POINT   3 OF   5 POINTS.
?
300,4 (ENTER)
```

```
          X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
             POINT   4 OF   5 POINTS.
?
200,10 (ENTER)

          X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
             POINT   5 OF   5 POINTS.
?
100,24 (ENTER)

     DO YOU WISH TO CHECK THE DATA INPUT FOR CURVE 1 ? (Y OR N)

y (ENTER)

              CURVE NUMBER 1
          X-VALUE          Y-VALUE
      1    4.99000E+02      1.00000E+00
      2    4.00000E+02      3.00000E+00
      3    3.00000E+02      4.00000E+00
      4    2.00000E+02      1.00000E+01
      5    1.00000E+02      2.40000E+01
ARE THESE DATA POINTS CORRECT FOR CURVE 1? (Y OR N)

y (ENTER)

          DO YOU WANT THIS CURVE DATA FILED FOR YOU? (Y OR N)

y (ENTER)

          **REFERENCE - DATA FOR CURVE  1 HAS BEEN FILED UNDER
             CURVE01 DATA, THIS FILE WILL NOT NECESSARILY BE UPDATED
             BUT COULD BE USED TO INPUT CURVE DATA LATER.

(see Figure C.7)

          DO YOU WISH TO UPDATE THIS GRAPH? (Y OR N)

y (ENTER)
```

```
          WHICH AREA WOULD YOU LIKE TO UPDATE?
               1.  PAGE SIZE
               2.  SUBPLOT AREA
               3.  GRAPH TITLE
               4.  X-AXIS TITLE
               5.  Y-AXIS TITLE
               6.  TYPE LETTERING
               7.  MESSAGE STATEMENT
               8.  MESSAGE LOCATION CHANGE
               9.  LEGEND LOCATION CHANGE
               10. X-AXIS SCALE
               11. Y-AXIS SCALE
               12. GRID
               13. CHANGE CURVES
               14. INPUT A COMPLETE NEW SET OF CURVES, THIS CLEARS OLD CURVES
               15. HELP
               16. PLOT THE UPDATED GRAPH
               17. NO CHANGES
?
6 (ENTER)
```

(see Figure C.6)

```
          WHAT IS THE NUMBER FOR THE TYPE LETTERING YOU DESIRE?
?
14 (ENTER)

          WHICH AREA WOULD YOU LIKE TO UPDATE?
               1.  PAGE SIZE
               2.  SUBPLOT AREA
               3.  GRAPH TITLE
               4.  X-AXIS TITLE
               5.  Y-AXIS TITLE
               6.  TYPE LETTERING
               7.  MESSAGE STATEMENT
               8.  MESSAGE LOCATION CHANGE
               9.  LEGEND LOCATION CHANGE
               10. X-AXIS SCALE
               11. Y-AXIS SCALE
               12. GRID
               13. CHANGE CURVES
               14. INPUT A COMPLETE NEW SET OF CURVES, THIS CLEARS OLD CURVES
               15. HELP
               16. PLOT THE UPDATED GRAPH
               17. NO CHANGES
?
16 (ENTER)
```

(see Figure C.8)

```
          WHICH AREA WOULD YOU LIKE TO UPDATE?
                1.  PAGE SIZE
                2.  SUBPLOT AREA
                3.  GRAPH TITLE
                4.  X-AXIS TITLE
                5.  Y-AXIS TITLE
                6.  TYPE LETTERING
                7.  MESSAGE STATEMENT
                8.  MESSAGE LOCATION CHANGE
                9.  LEGEND LOCATION CHANGE
                10. X-AXIS SCALE
                11. Y-AXIS SCALE
                12. GRID
                13. CHANGE CURVES
                14. INPUT A COMPLETE NEW SET OF CURVES, THIS CLEARS OLD CURVES
                15. HELP
                16. PLOT THE UPDATED GRAPH
                17. NO CHANGES
?
17 (ENTER)
          WOULD YOU LIKE THIS GRAPH DATA FILED? (Y OR N)
          (GRAPH MUST BE FILED TO MAKE A HARD COPY)
y (ENTER)
          UNDER WHAT NAME WOULD YOU LIKE THIS DATA FILED?

helodesn (ENTER)
          THIS DATA HAS BEEN SAVED IN FILE NAMED "HELODESN" DATA.
          DO YOU WISH TO DEVELOP ANOTHER GRAPH? (Y OR N)

n (ENTER)
END OF DISSPLA 9.0 -- 22572 VECTORS GENERATED IN 3 PLOT FRAMES.
    PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
5192 VIRTUAL STORAGE REFERENCES; 61 READS; 2 WRITES.
```

```
**********************************************************************

DO YOU WANT A VRSTEC HARD COPY? (Y OR N)

*** NOTE ****

1. THIS WILL REQUIRE BETWEEN 2% TO 20% OF YOUR A DISK
DEPENDING ON THE NUMBER OR SIZE OF YOUR GRAPH(S).

2. USE YOUR PROJECT NUMBER IF YOU HAVE ONE,
IF NOT, USE YOUR USERID NUMBER WITH NO "P".

3. YOUR GRAPHS WILL BE SENT TO THE COMPUTER CENTER
USING THE NAME "POP(USERID)"

**********************************************************************

y (ENTER)

EXECUTION BEGINS...
>> USING A PRE-ALLOCATED DATASET FOR UNIT FT17F001.

          WHAT IS THE FILE NAME OF YOUR GRAPH?

helodesn (ENTER)

>> USING A PRE-ALLOCATED DATASET FOR UNIT FT18F001.

          DO YOU WISH TO PLOT ANOTHER GRAPH? (Y OR N)

n (ENTER)

END OF DISSPLA 9.0 -- 16086 VECTORS GENERATED IN 1 PLOT FRAMES.
     PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
7030 VIRTUAL STORAGE REFERENCES; 8 READS; 0 WRITES.

Please enter your project code.
1234 (ENTER)

CREATING NEW FILE:
CREATING NEW FILE:
DASD 122 DETACHED

**********************************************************************

YOUR GRAPH CAN BE PICKED UP AT THE COMPUTER CENTER
UNDER THE FOLLOWING NAME "POP(YOUR USERID)".

**********************************************************************
```

APPENDIX C

FIGURES

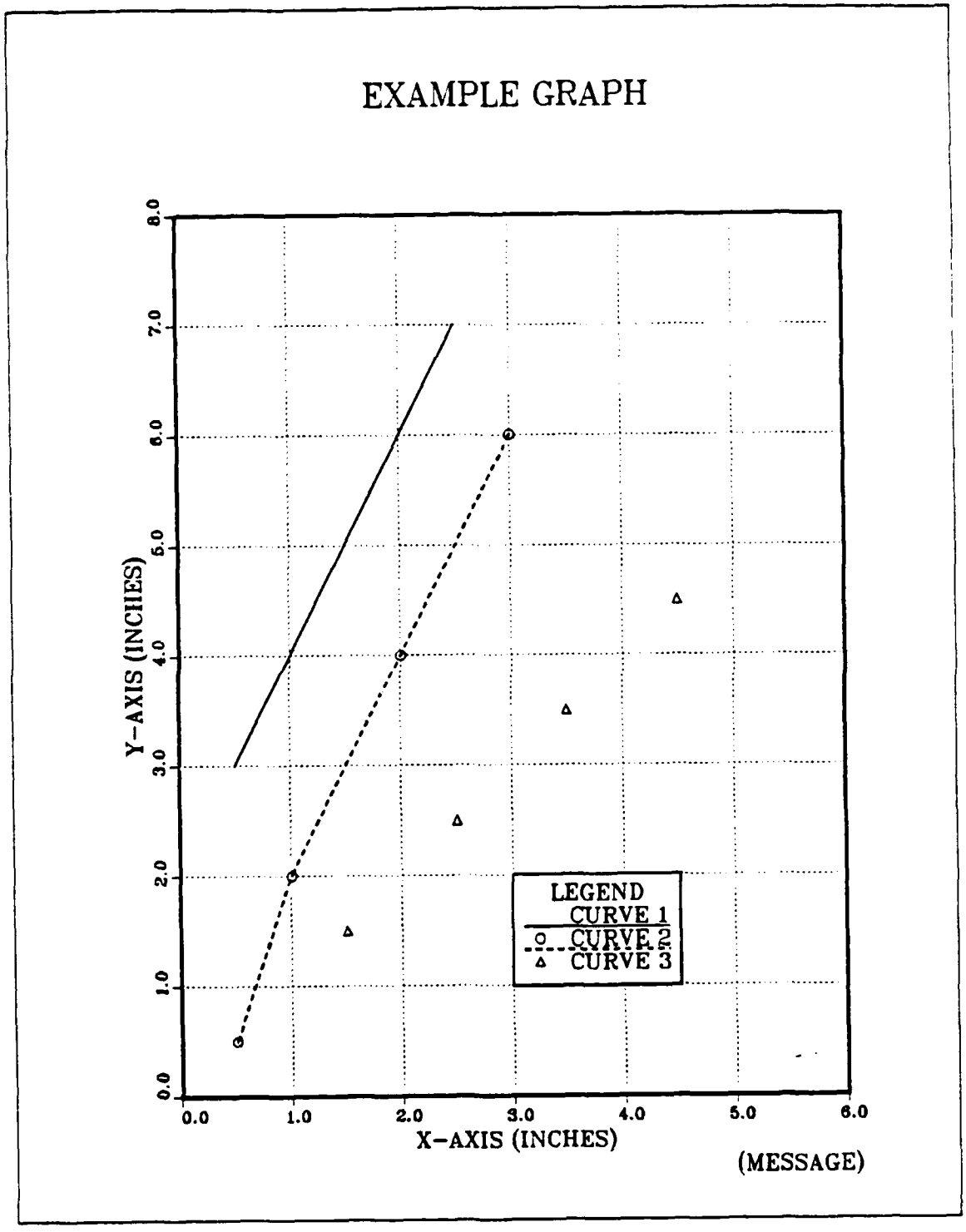


Figure C.1 Vertical Two-dimensional Standard Axes Example.

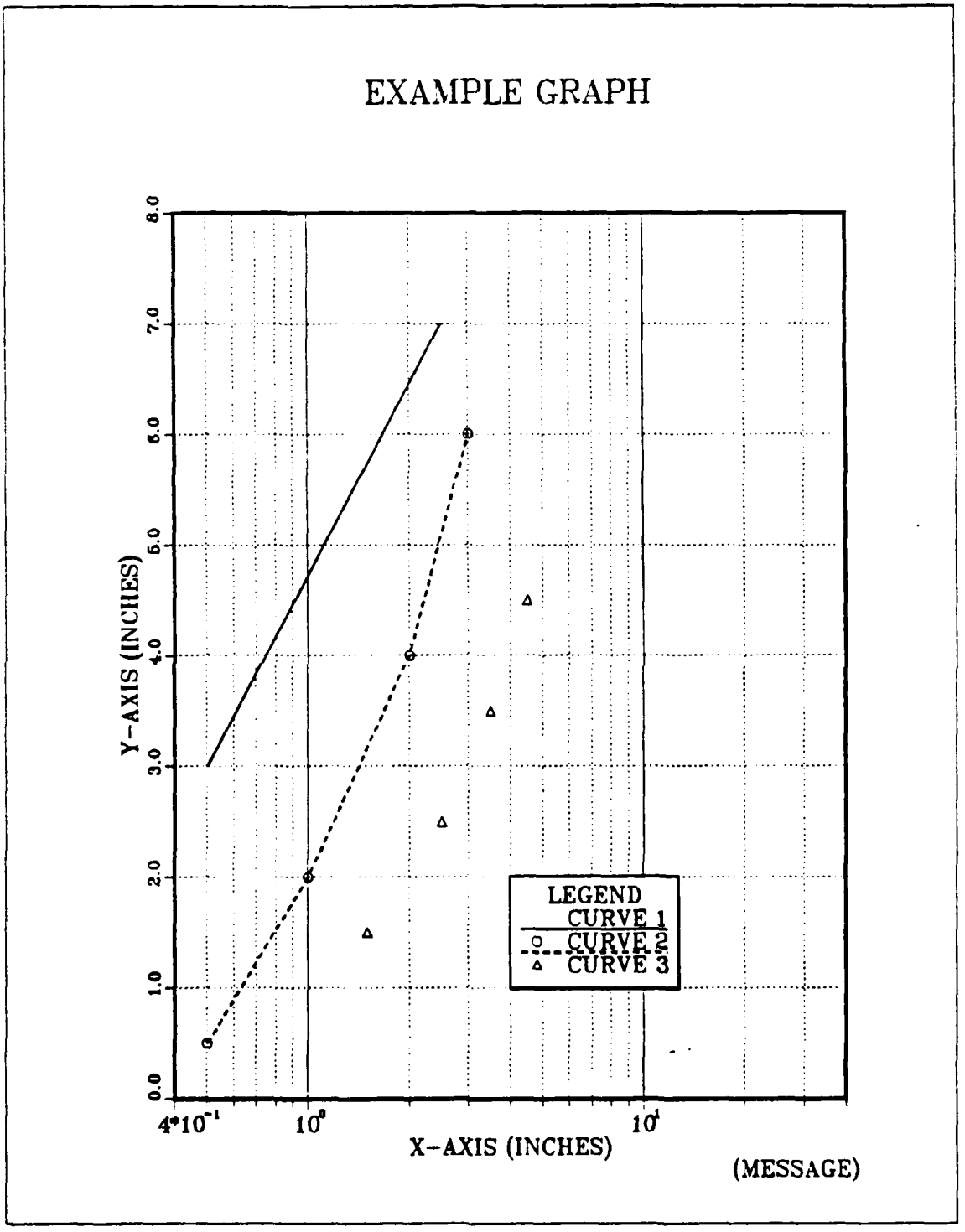


Figure C.2 Two-dimensional Semi-log Axes Example.

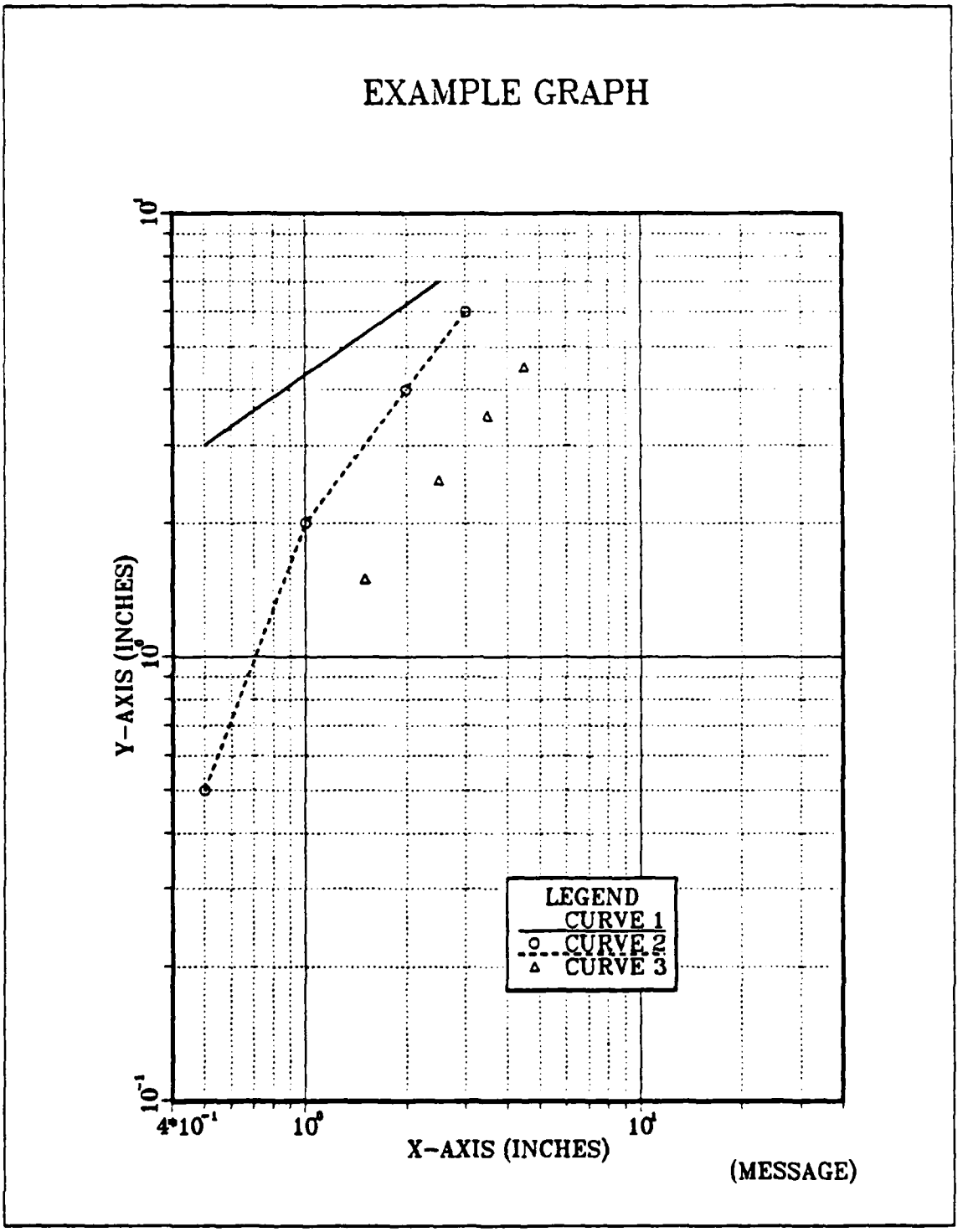


Figure C.3 Two-dimensional Log-log Axes Example.

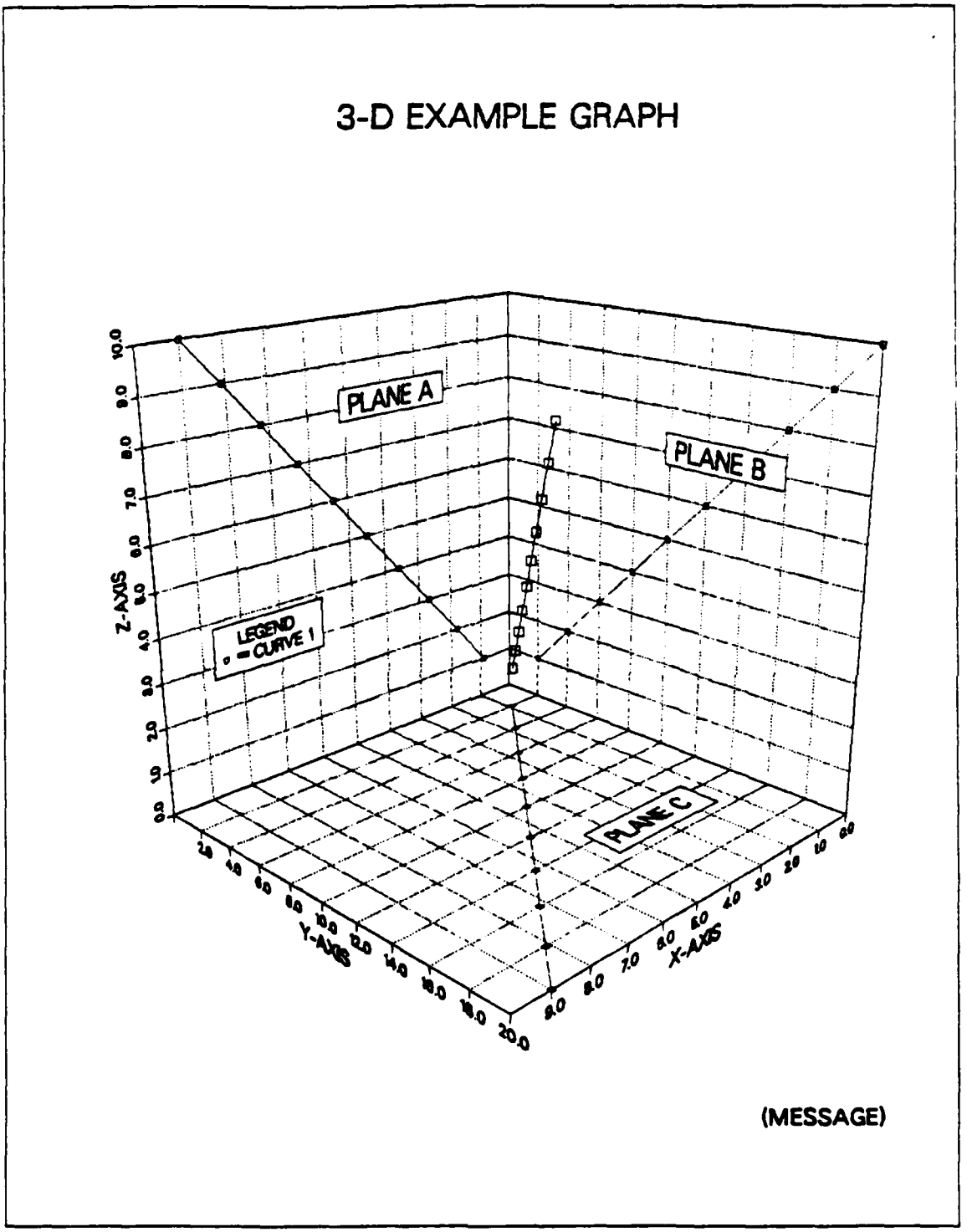


Figure C.4 Three-dimensional Standard Axes Example.

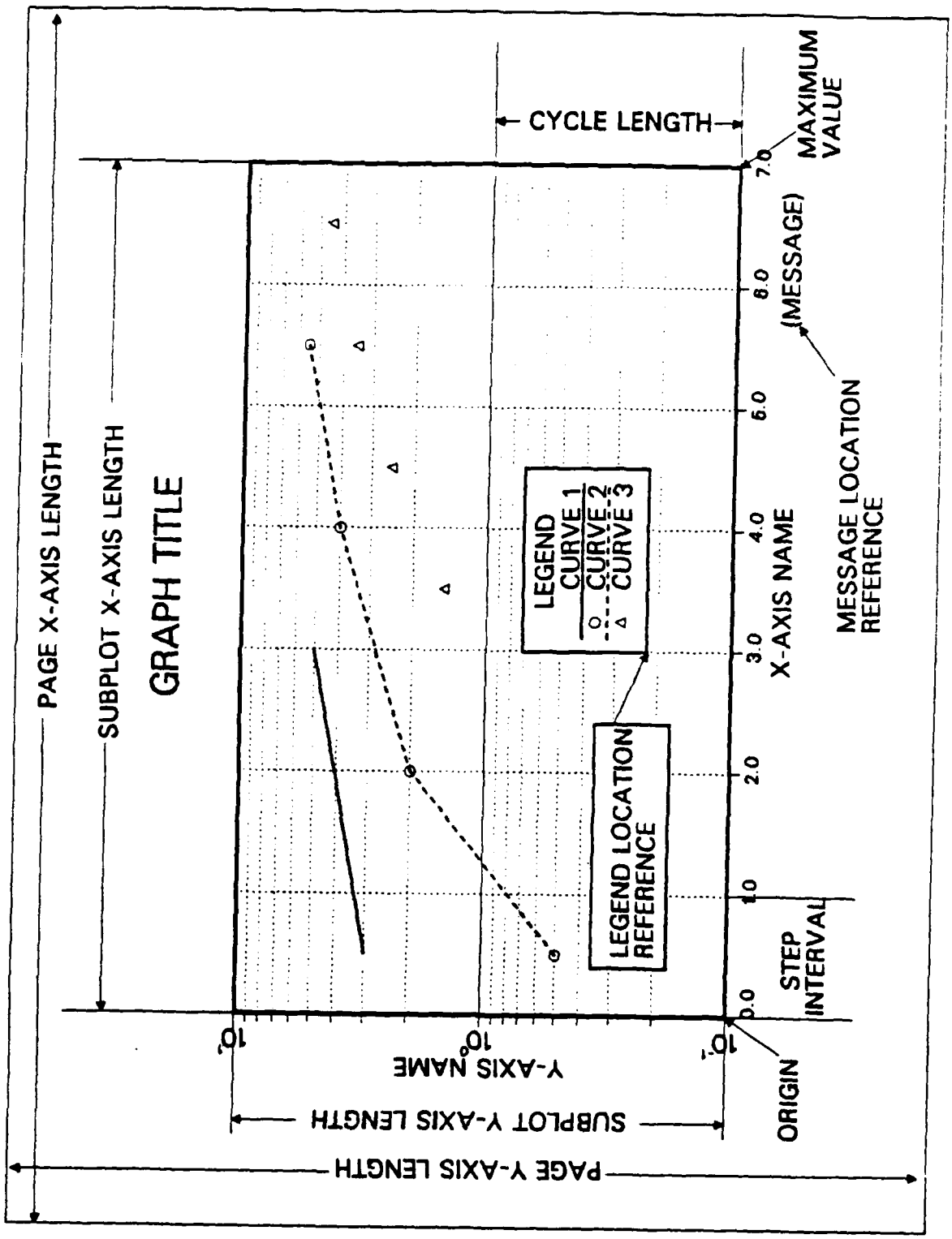


Figure C.5 Help File Example Graph.

EXAMPLES OF CHARACTER FONTS AVAILIBLE:

1.STANDARD
2. CARTOG
3. SIMPLX
4. SCMPLX
5. COMPLX
6. DUPLX
7. TRIPLX
8. GOTHIC
9. FUTURA
10. SERIF
11. LOGO1
12. FASHON
13. SWISSL
14. SWISSM
15. SWISSB

Figure C.6 Lettering Style.

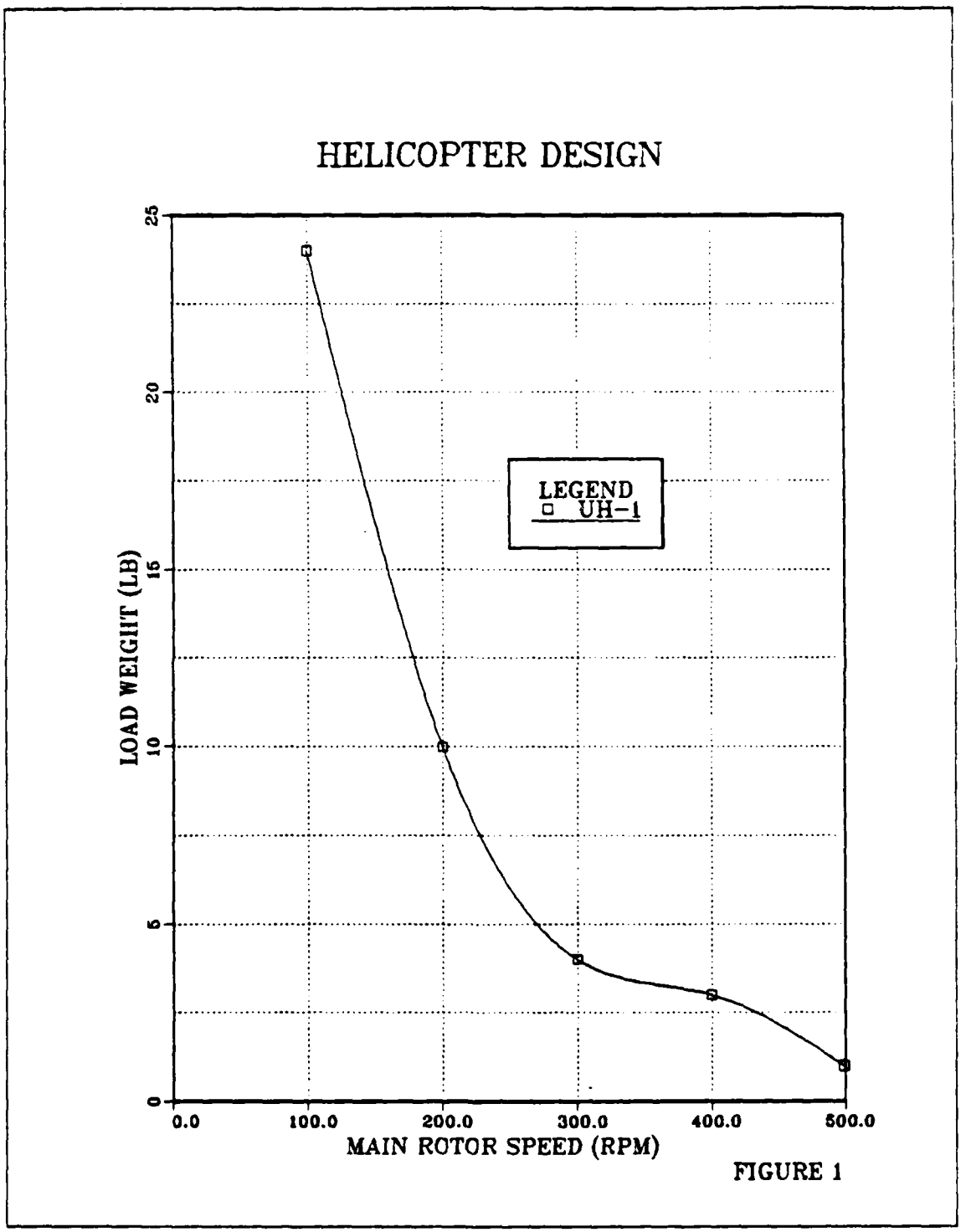


Figure C.7 Demonstration Graph Initial.

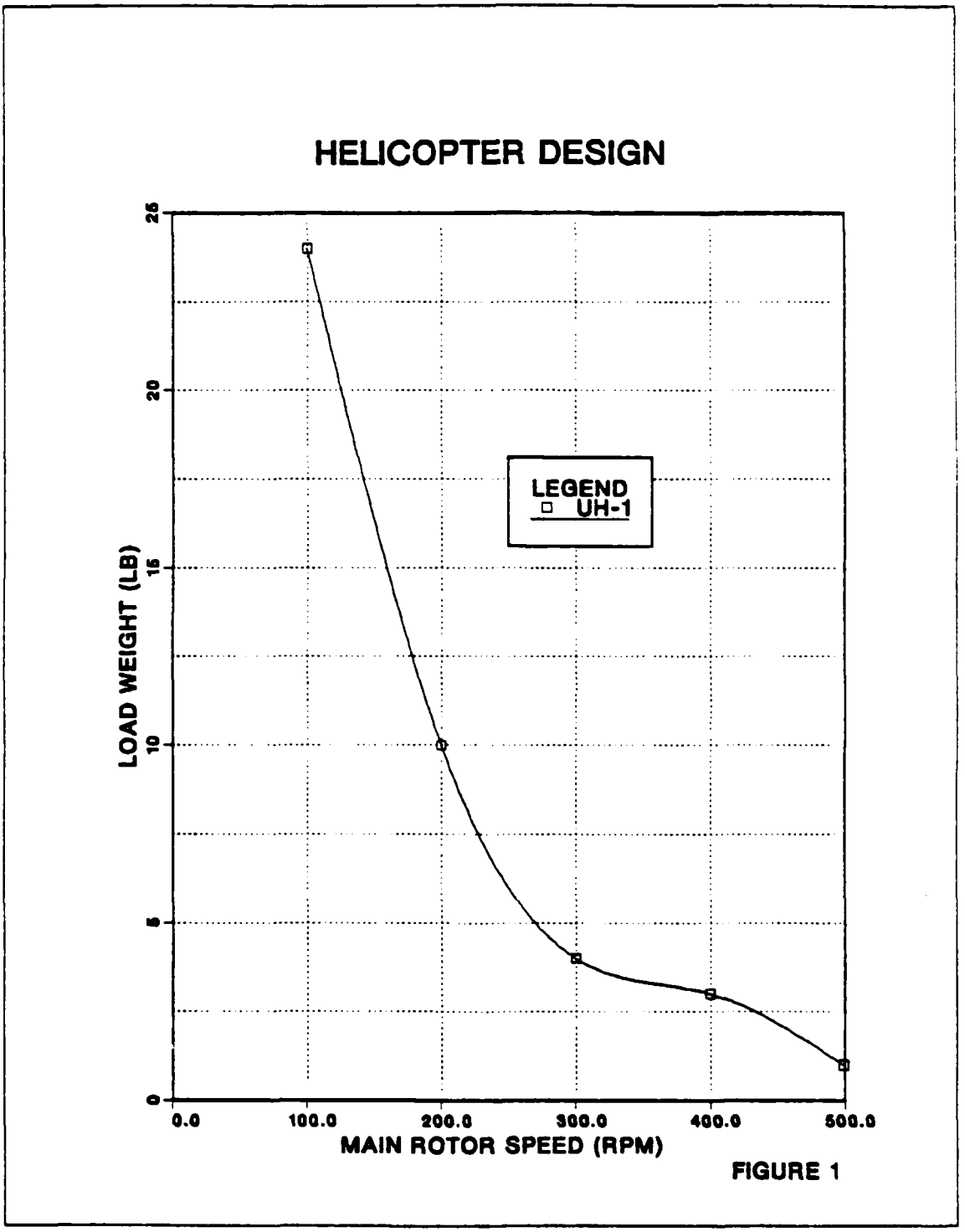


Figure C.8 Demonstration Graph Final.

APPENDIX D

FORTRAN PROGRAM

```
C*****************************************************************
C*****************************************************************
C****                                                           ****
C****   DEFINITON OF VARIABLE LIST FOR GRAPHICAL EXEC WHICH WILL ****
C****         WORK WITH USER TO PRODUCE AND UPDATE GRAPHS.      ****
C****                                                           ****
C****                VARIABLES AND CONSTANTS                    ****
C****                                                           ****
C****    INGRAY      AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS ****
C****                DISSPLA PARAMETERS.                        ****
C****                                                           ****
C****    RELRAY      AN ARRAY CONTAINING REAL NUMBERS FOR VARIOUS ****
C****                DISSPLA PARAMETERS.                        ****
C****                                                           ****
C****    LETRAY      AN ARRAY CONTAINING CHARACTER STRING       ****
C****                INFORMATION FOR VARIOUS DISSPLA INFORMATION. ****
C****                                                           ****
C****    IFRAY       AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS ****
C****                USER DECISIONS.                            ****
C****                                                           ****
C****    FILPLT      AN ARRAY CONTAINING THE USER DEFINED NAME  ****
C****                FOR GRAPH STORAGE.                         ****
C****                                                           ****
C****    XPLOT       AN ARRAY CONTAINING THE X VALUES FOR THE   ****
C****                DIFFERENT DATA POINTS.                     ****
C****                                                           ****
C****    YPLOT       AN ARRAY CONTAINING THE Y VALUES FOR THE   ****
C****                DIFFERENT DATA POINTS.                     ****
C****                                                           ****
C****    ZPLOT       AN ARRAY CONTAINING THE Z VALUES FOR THE   ****
C****                DIFFERENT DATA POINTS.                     ****
C****                                                           ****
C****    LINE        AN ARRAY USED AS A DUMMY VARIABLE FOR      ****
C****                CHARACTER STRINGS.                         ****
C****                                                           ****
C****    X           AN ARRAY CONTAINING THE X VALUES FOR THE   ****
C****                DIFFERENT DATA POINTS.                     ****
C****                                                           ****
C****    Y           AN ARRAY CONTAINING THE Y VALUES FOR THE   ****
C****                DIFFERENT DATA POINTS.                     ****
C****                                                           ****
C****    Z           AN ARRAY CONTAINING THE Z VALUES FOR THE   ****
C****                DIFFERENT DATA POINTS.                     ****
C****                                                           ****
C*****************************************************************
C*****************************************************************
```

```
C****
C****                DEFINITION OF PROGRAM SUBROUTINES                  ****
C****                                                                   ****
C****  TDCON         SUBRCUTINE TO CONTROL CONSTRUCION CF 2-D GRAPHS.   ****
C****                                                                   ****
C****  TWOD          SUBROUTINE TO CONTROL CONSTRUCTION OF NEW 2-D      ****
C****                GRAPHS.                                            ****
C****                                                                   ****
C****  EX2D          SUBRCUTINE TO INPUT THE GRAPHICS DEVICE BEING USED.****
C****                                                                   ****
C****  EXAMPL        SUBRCUTINE TO DISPLAY POSSIBLE CHOICES OF GRAPH    ****
C****                ORIENTATION.                                       ****
C****                                                                   ****
C****  PAGE2         SUBRCUTINE TO DETERMINE THE PAGE SIZE FOR TWO-     ****
C****                DIMENSIONAL PLOTS.                                 ****
C****                                                                   ****
C****  SUBPLT        SUBRCUTINE TO DETERMINE THE TWO-DIMENSIONAL        ****
C****                SUBPICT AREA.                                      ****
C****                                                                   ****
C****  HEADNG        SUBRCUTINE REQUESTING GRAPH TITLE.                 ****
C****                                                                   ****
C****  XAXIS         SUBRCUTINE REQUESTING TITLE OF X-AXIS.             ****
C****                                                                   ****
C****  YAXIS         SUBRCUTINE REQUESTING TITLE OF Y-AXIS.             ****
C****                                                                   ****
C****  ZAXIS         SUBRCUTINE REQUESTING TITLE OF Z-AXIS.             ****
C****                                                                   ****
C****  PATNER        SUBRCUTINE REQUESTING TYPE LINE PATTERN DESIRED.   ****
C****                                                                   ****
C****  PAT           SUBRCUTINE EXECUTING TYPE LINE PATTERN DESIRED.    ****
C****                                                                   ****
C****  FITTYP        SUBRCUTINE REQUESTING TYPE OF CURVE FIT DESIRED.   ****
C****                                                                   ****
C****  FIT           SUBRCUTINE EXECUTING TYPE OF CURVE FIT DESIRED.    ****
C****                                                                   ****
C****  CCIOR         SUBRCUTINE EXECUTING COLOR PEN USED TO DRAW GRAPH. ****
C****                                                                   ****
C****  STYLE         SUBRCUTINE DETERMINING TYPE OF LETTERING DESIRED.  ****
C****                                                                   ****
C****  LETTAR        SUBRCUTINE EXECUTING TYPE OF LETTERING DESIRED.    ****
C****                                                                   ****
C****  MESS          SUBRCUTINE DETERMINING MESSAGE CONTENT             ****
C****                AND LCCATION.                                      ****
C****                                                                   ****
C****  LOCLEG        SUBRCUTINE REQUESTING LOCATION OF THE LEGEND.      ****
C****                                                                   ****
C****  XVALUE        SUBRCUTINE SETTING THE SCALE ON THE X-AXIS.        ****
C****                                                                   ****
C****  YVALUE        SUBRCUTINE SETTING THE SCALE ON THE Y-AXIS.        ****
```

```
C****
C**** ZVALUE     SUBRCUTINE SETTING THE SCALE ON THE Z-AXIS.                ****
C****
C**** GRIDDE     SUBRCUTINE DETERMINING THE GRID LINE PATTERN.              ****
C****
C**** CRVS       SUBRCUTINE DETERMINING CURVE PLOTS.                        ****
C****
C**** VERT       SUBRCUTINE DISPLAYING THE VERTICAL GRAPH EXAMPLE           ****
C****            FOR TWO DIMENSIONS.                                        ****
C****
C**** HORT       SUBRCUTINE DISPLAYING THE HORIZONTAL GRAPH EXAMPLE         ****
C****            FOR TWO DIMENSIONS.                                        ****
C****
C**** LETEXM     SUBROUTINE DISPLAYING TYPE OF LETTERING AVAILABLE.         ****
C****
C**** PLOT2D     SUBROUTINE FOR A GRAPH IN TWO DIMENSIONAL                  ****
C****            COORDINATES.                                               ****
C****
C**** LETTER     SUBRCUTINE WHICH COUNTS THE NUMBER OF LETTERS AND          ****
C****            ADDS THE $ FOR CENTERING CHARACTER STRINGS PER             ****
C****            DISSPLA REQUIREMENTS.                                      ****
C****
C**** CHANGE     SUBRCUTINE WHICH CONVERTS CHARACTER ARRAYS FROM            ****
C****            TWO TO ONE DIMENSIONS PER FORTRAN CONSTRAINTS.             ****
C****
C**** SWITCH     SUBRCUTINE WHICH CONVERTS NUMBER ARRAYS FROM               ****
C****            TWO TO ONE DIMENSIONS PER FORTRAN CONSTRAINTS.             ****
C****
C**** USRFIL     SUBRCUTINE TO GET FILE FOR USER TO PLOT A CURVE.           ****
C****
C**** FILE       SUBRCUTINE DEFINING FILE FOR USER.                         ****
C****
C**** READ       SUBRCUTINE TO READ THE STORED GRAPH'S DATA FILE.           ****
C****
C**** READRE     SUBROUTINE TO READ REAL VALUES.                            ****
C****
C**** READIN     SUBRCUTINE TO READ INTEGER VALUES.                         ****
C****
C**** ZERO       SUBRCUTINE TO SET ALL ARRAYS TO INITIAL VALUES.            ****
C****
C**** YORN       SUBRCUTINE WHICH CHECKS THE ANSWER YES OR NO               ****
C****            THEN ASSIGNS YES = 1, NO = 2, ERROR = 3.                   ****
C****
C**** REVISE     SUBRCUTINE TO REVISE OLD GRAPHS.                           ****
C****
C**** UPCRVS     SUBRCUTINE TO UPDATE DECISIONS ON CURVES AND DATA.         ****
C****
C**** DATCHK     SUBRCUTINE TO VERIFY DATA FOR EACH CURVE.                  ****
C****
```

```
C**** DPCINT     SUBRCUTINE TO DELETE A DATA POINT.                          ****
C****                                                                        ****
C**** DCURVE     SUBROUTINE TO DELETE A CURVE.                               ****
C****                                                                        ****
C**** APCINT     SUBRCUTINE TO ADD A DATA POINT.                             ****
C****                                                                        ****
C**** THREED     SUBROUTINE TO CONTROL CONSTRUCION OF 3-D GRAPHS.            ****
C****                                                                        ****
C**** TH3D       SUBROUTINE TO CONTROL CONSTRUCTION OF NEW 3-D               ****
C****            GRAPHS.                                                     ****
C****                                                                        ****
C**** CRVS3D     SUBRCUTINE TO DETERMINE CURVE PLOTS FOR 3-D GRAPHS.         ****
C****                                                                        ****
C**** USRF3I     SUBRCUTINE TO GET FILE FOR USER TO PLOT A CURVE.            ****
C****                                                                        ****
C**** REV3D      SUBRCUTINE TO REVISE OLD GRAPHS.                            ****
C****                                                                        ****
C**** UPCR3D     SUBROUTINE TO UPDATE DECISIONS ON CURVES AND DATA.          ****
C****                                                                        ****
C**** DTCH3D     SUBRCUTINE TO VERIFY DATA FOR EACH GRAPH.                   ****
C****                                                                        ****
C**** DPNT3D     SUBROUTINE TO DELETE A DATA POINT.                          ****
C****                                                                        ****
C**** APNT3D     SUBRCUTINE TO ADD A DATA POINT.                             ****
C****                                                                        ****
C**** EXAM3D     SUBROUTINE DISPLAYING A 3-D EXAMPLE FOR USER.               ****
C****                                                                        ****
C**** GRID3D     SUBRCUTINE TO DETERMINE THE GRID LINE PATTERN.              ****
C****                                                                        ****
C********************************************************************************
C********************************************************************************
C****                                                                        ****
C****                  INSTRUCTIONS FOR USE OF THIS PROGRAM.                 ****
C****     1. INSURE THE PROGRAM HAS BEEN COMPILED IN FORTHX.                 ****
C****     2. DEFINE STCRAGE 1M                                               ****
C****     3. I CMS                                                           ****
C****     4. DISSPLA GRAPH                                                   ****
C****     5. ANSWER THE QUESTIONS.                                           ****
C****                                                                        ****
C********************************************************************************
C********************************************************************************
C**** GRAPH                                                                  ****
C****                                                                        ****
C****          PROGRAM TO CONTROL OF CONSTRUCTION OF GRAPHS.                 ****
C****                                                                        ****
C********************************************************************************
C********************************************************************************
C
C   DECLARATIONS.
```

```
C
      INTEGER NN,IDIC
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &,ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  DECISION OF WHICH TYPE GRAPH THE USER WISHES TO DEVELOP.
C
      CALL ZERO
      CALL FRTCMS ('CLRSCRN ')
 5    WRITE(6,610)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR(YES=1,NO=2,ERROR=3).
C
      CALL YORN (IDIC)
         GO TO (9,90,5), IDIC
 9    CALL FRTCMS('CLRSCRN ')
 10   WRITE(6,620)
C
C  SUBROUTINE REEDIN READS ANSWER.
C
         CALL REEDIN(NN,&15)
         IF (NN .GT. 0 .AND. NN .LT. 6) GO TO 20
 15      CALL ERROR4 (1,5)
         GO TO 10
 20      IFRAY(5) = NN
         GO TO (30,30,30,30,50),NN
C
C  DEVELOPS TWO-DIMENSIONAL GRAPHS.
C
 30   CALL TDCON
      GO TO 90
C
C  DEVELOPS THREE-DIMENSIONAL GRAPHS WITH STANDARD AXES.
C
 50   CALL THREED
      GO TO 90
 90   CONTINUE
      STOP
C
C  FORMAT STATEMENTS.
C
 610     FORMAT(//15X,'**** MESSAGE TO USER **** '
     &/10X,'A. SIMPLY ANSWER THE QUESTIONS AS PRESENTED!'
     &/10X,'B. ANY ERRORS MADE MAY BE CORRECTED LATER DURING EDITING.'
     &/10X,'C. TO USE YOUR OWN FILES FOR CURVE DATA INPUT, YOU MUST HAVE
     &'
     &/13X,'A FIXED FILE, 80 CHARACTERS IN LENGTH WITH A SPACE OR COMMA'
     &/13X,'BETWEEN VALUES.'
```

```
     &/10X,'D. TO EXIT FROM THIS PROGRAM, ANSWER ANY QUESTION WITH -99.9
     &9.'
     &//13X,'**** DO YOU WISH TO CONTINUE WITH THIS PROGRAM? (Y OR N)')
620       FORMAT(//10X,'WHICH TYPE GRAPH DO YOU WISH TO DEVELOP?'/
     &/10X,'1.  TWO-DIMENSIONAL GRAPH WITH STANDARD AXES'
     &/10X,'2.  TWO-DIMENSIONAL SEMI-LOG GRAPH, WITH X AS THE LOG AXIS'
     &/10X,'3.  TWO-DIMENSIONAL SEMI-LOG GRAPH, WITH Y AS THE LOG AXIS'
     &/10X,'4.  TWO-DIMENSIONAL LOG-LOG GRAPH'
     &/10X,'5.  THREE DIMENSIONAL GRAPH WITH STANDARD AXES'
     &)
      END
C*****************************************************************************
C*****************************************************************************
C**** CPY                                                                  ****
C****                                                                      ****
C****         PROGRAM TO CONTROL CONSTRUCTION FOR VERSATEC GRAPHS.         ****
C****                                                                      ****
C*****************************************************************************
C*****************************************************************************
C
C  DECLARATIONS.
C
      INTEGER I, IDIC
      REAL RR
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IIRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
      IFRAY(11) = 2
C
C  GRAPHICS DEVICE TO BE USED.
C
      CALL COMPRS
      CALL ZERO
C
C  DETERMINES FILE NAME OF GRAPH USER WISHES TO PLOT.
C
      CALL FRTCMS('CLRSCRN ')
 10   WRITE(6,620)
      READ(5,520,END=15) (FILPIT(I),I=1,2)
      CALL FRTCMS('EXEC    ','CHECK   ',FILPLT,NN)
      READ(5,*) NN
      IF (NN .EQ. 0) GO TO 20
      CALL FRTCMS('CLRSCRN ')
 12   WRITE(6,640)
      CALL FEEDIN(NN,&13)
      IF (NN .GT. 0 .AND. NN .LT. 3) GO TO 14
 13   CALL ERROR4(1,2)
      GO TO 12
 14   GO TO (10,110),NN
```

```
      GO TO 20
 15   CALL ERROR8
      GO TO 10
C
C  SUBROUTINE REED INPUTS GRAPH DATA FROM USER'S FILE.
C
20    CALL REED
      I = IFRAY(5)
      GO TO (30,30,30,30,40), I
C
C  SUBROUTINE PLOT2D PLOTS USER'S GRAPH
C
30    CALL PLOT2D
      GO TO 90
40    CALL PLOT3D
      GO TO 90
90    CONTINUE
C
C  DETERMINES IF THE USER WANTS TO PLOT ANOTHER GRAPH.
C
      CALL FRTCMS('CLRSCRN ')
 100  WRITE(6,630)
      CALL YORN(IDEC)
      GO TO (10,110,100),IDEC
C
C  SUBROUTINE DONEPL TERMINATES PLOTTING SEQUENCE.
C
110   CALL DONEPL
      STOP
C
C  FORMAT STATEMENTS.
C
 520      FORMAT (2A4)
 620      FORMAT(//10X,'WHAT IS THE FILE NAME OF YOUR GRAPH?')
 630      FORMAT(//10X,'DO YOU WISH TO PLOT ANOTHER GRAPH? (Y OR N)')
 640      FORMAT(//10X,'"FILE NAME WAS NOT FOUND", PLEASE ENTER ONE OF TH
     &E FOLLOWING'/15X,'1. REENTER THE FILE NAME'
     &/15X,'2. EXIT')
      END
C*************************************************************************
C*************************************************************************
C****IDCCN                                                            ****
C****                                                                ****
C****       SUBROUTINE TO CONTROL CONSTRUCTION OF 2-D GRAPHS.        ****
C****                                                                ****
C****                VARIABLES AND CONSTANTS                         ****
C****                                                                ****
C****   FLTPLT     ARRAY CONTAINING FILE NAME OF GRAPH USER WISHES   ****
C****              TO EDIT.                                          ****
```

```
C****                                                                  ****
C****   IFRAY(5)  THE TYPE OF GRAPH USER DESIRES TO DEVELOP.           ****
C****                                                                  ****
C**********************************************************************
C**********************************************************************
      SUBROUTINE TDCCN
C
C  DECLARATIONS.
C
      INTEGER I, IDIC
      REAL RR
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  SUBROUTINE EX2D DETERMINES WHICH GRAPHICS DEVICE IS BEING USED.
C
      CALL FRTCMS ('CLRSCRN ')
      CALL EX2D
      CALL FRTCMS ('CLRSCRN ')
C
C  DECISION TO INPUT A NEW GRAPH OR EDIT AN OLD ONE.
C
 10   WRITE(6,610)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
        CALL YORN(IDIC)
        GO TO (30,20,10),IDIC
C
C  SUBROUTINE TWOD INPUTS DATA FOR A NEW GRAPH.
C
 20   CALL TWOD
      GO TO 70
C
C  DETERMINES FILE NAME OF GRAPH USER WISHES TO EDIT.
C
 30   WRITE(6,620)
      READ(5,520,END=35) (FILPLT(I),I=1,2)
      CALL FRTCMS('EXEC    ','CHECK   ',FILPLT  ,NN)
      READ(5,*) NN
      CALL FRTCMS ('CLRSCRN ')
        IF (NN .EQ. 0) GO TO 34
 31     WRITE(6,660)
        CALL REEDIN(NN,632)
        IF (NN .GT. 0 .AND. NN .LT. 3) GO TO 33
 32     CALL ERROR4 (1,2)
        GO TO 31
 33     GO TO (30,20),NN
```

```
 34    CALL FRTCMS('FILEDEF ','3       ','DISK    ',FILPIT  ,'DATA    ')
       CALL FRTCMS ('CIRSCRN ')
       GO TO 40
 35    CALL ERROR8
       GO TO 30
C
C  SUBROUTINE REED INPUTS GRAPH DATA FROM USER'S FILE.
C
 40    NN = IFRAY(5)
       CALL REED
       IFRAY(5) = NN
C
C  SUBROUTINE PLOT2D PLOTS USER'S 2-D GRAPH.
C
C      NN = IFRAY(5)
       GO TO (50,50,50,50,60),NN
50     CALL PLOT2D
       GO TO 70
C
C  SUBROUTINE PLOT3D PLOTS USER'S 3-D GRAPH.
C
60     CALL PLOT3D
       CALL REV3D
       GO TO 70
C
C  DECISION FOR USER TO CONTINUE EDITING GRAPH.
C
 70    WRITE (6,630)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
          CALL YORN(IDIC)
          GO TO (80,90,70),IDIC
C
C  SUBROUTINE REVISE EDITS USER'S GRAPH.
C
 80    CALL REVISE
 90    CONTINUE
C
C  SUBROUTINE FILE FILES GRAPH DATA UNDER USER'S DEFINED FILE NAME
C  FOR FURTHER USE.
C
       CALL FRTCMS ('CIRSCRN ')
       CALL FILE
C
C  DECISION FOR USER TO CONTINUE WORKING ON A NEW GRAPH.
C
 100   WRITE (6,640)
C
```

```
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
      CALL YORN(IDIC)
      GO TO (109,130,100),IDIC
C
C  SUBROUTINE REEDIN INPUTS SELECTION OF TYPE GRAPH TO BE DEVELOPED.
C
 109  CALL FRTCMS ('CIRSCRN ')
 110  WRITE (6,650)
      CALL REEDIN(NN,&115)
      IF (NN .GT. 0 .AND. NN .LT. 6) GO TO 120
 115  CALL ERROR4 (1,4)
      GO TO 110
 120  CALL ZERO
      IFRAY(5) = NN
      GO TO 10
 130  CONTINUE
C
C  SUBROUTINE DONEPL TERMINATES PLOTTING SEQUENCE.
C
      CALL DONEPL
      RETURN
C
C  FORMAT STATEMENTS.
C
 510      FORMAT (I2)
 520      FORMAT (2A4)
 610      FORMAT(/15X,'IS THIS AN UPDATE OF AN OLD GRAPH? (Y OR N) ')
 620      FORMAT(//10X,'WHAT IS THE FILE NAME OF YOUR GRAPH?')
 630      FORMAT(//10X,'DO YOU WISH TO UPDATE THIS GRAPH? (Y OR N) ')
 640      FORMAT(//10X,'DO YOU WISH TO DEVELOP ANOTHER GRAPH? (Y OR N)')
 650      FORMAT(//10X,'WHICH TYPE GRAPH DO YOU WISH TO DEVELOP?'/
     &/10X,'1. TWO DIMENSIONAL GRAPH WITH STANDARD AXES'
     &/10X,'2. TWO DIMENSIONAL SEMI-LOG GRAPH, WITH X AS THE LOG AXIS'
     &/10X,'3. TWO DIMENSIONAL SEMI-LOG GRAPH, WITH Y AS THE LOG AXIS'
     &/10X,'4. TWO DIMENSIONAL LOG-LOG GRAPH'
     &)
 660      FORMAT(//10X,'"FILE NAME WAS NOT FOUND" PLEASE ENTER ONE OF TH
     &E FOLLOWING'//10X,'1. REENTER THE FILE NAME'
     &/10X,'2. CONTINUE BY ENTERING A NEW GRAPH')
      END
C*************************************************************************
C*************************************************************************
C****TWOD                                                             ****
C****                                                                ****
C****    SUBROUTINE TO CONTROL CONSTRUCTION NEW 2-D GRAPHS.          ****
C****                                                                ****
C*************************************************************************
C*************************************************************************
```

```
      SUBROUTINE TWOD
C
C  DECLARATIONS.
C
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,ZPLOT(100), Z(18,100), JCOLOR(25)
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE ZERO CLEARS WORKING FILE SPACE.
C
      ID = IFRAY(5)
      CALL ZERO
      IFRAY(5) = ID
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE EXAMPL DISPLAYS AN EXAMPLE TO GUIDE USER.
C
      CALL EXAMPL
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE PAGE2D DETERMINES DESIRED PAGE SIZE FOR GRAPH.
C
      CALL PAGE2D
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE SUBPLT DETERMINES DIMENSIONS OF SUBPLOT AREA.
C
      CALL SUBPLT
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE HEADNG INPUTS TITLE OF USER'S GRAPH.
C
      CALL HEADNG
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE XAXIS INPUTS TITLE OF X-AXIS.
C
      CALL XAXIS
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE YAXIS INPUTS TITLE OF Y-AXIS.
C
      CALL YAXIS
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE MESS INPUTS A MESSAGE FOR THE USER.
C
      CALL MESS (1)
```

```
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE LOCLEG DETERMINES LEGEND LOCATION.
C
      CALL LOCLEG
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE XVALUE INPUTS ORIGIN VALUE, STEP, AND MAX VALUE OF X-AXIS.
C
      CALL XVALUE
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE YVALUE INPUTS ORIGIN VALUE, STEP, AND MAX VALUE OF Y-AXIS.
C
      CALL YVALUE
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE GRIDDE INPUTS GRID LINE INFORMATION.
C
      CALL GRIDDE
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE CRVS INPUTS THE DATA FOR USER'S CURVES.
C
      CALL CRVS
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE PLOT2D PLOTS USER'S GRAPH.
C
      CALL PLOT2D
      RETURN
      END
C*************************************************************************
C*************************************************************************
C****EX2D                                                             ****
C****                                                                ****
C****    SUBROUTINE TO INPUT THE GRAPHICS DEVICE BEING USED.         ****
C****                                                                ****
C****                 VARIABLES AND CONSTANTS                        ****
C****                                                                ****
C****   IDIC       USED TO STORE YES OR NO ANSWERS.                  ****
C****                                                                ****
C****   NN         DUMMY INTEGER VALUE FOR DEVICE TYPE.              ****
C****                                                                ****
C****   IFRAY(2)   DETERMINES WHICH GRAPHIC DEVICE IS BEING USED.    ****
C****                                                                ****
C****   IFRAY(11) DETERMINES IF THE USER WANTS TO USE COLOR.         ****
C****                                                                ****
C*************************************************************************
```

```
C*******************************************************************************
      SUBROUTINE EX2D
C
C  DECLARATIONS.
C
      INTEGERNN, IDIC
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPICT(100), Z(18,100), JCOLOR(25)
      CALL FRTCMS ('CIRSCRN ')
C
C  DETERMINES THE SIZE OF THE BUFFER TO BE USED.
C
      CALL IRGBUF
C
C  DETERMINES THE TYPE OF GRAPHICS DEVICE BEING USED AND IMPLEMENTS
C  APPROPRIATE DISSPLA CALL.
C
      IFRAY(11) = 2
 10   WRITE (6, 610)
      CALL FREDIN(NN,&15)
      IFRAY(2) = NN
         IF (NN.GT. 0 .AND. NN.LT. 6) GO TO 20
 15         CALL ERRCR4 (1,5)
            GO TO 10
 20      GO TO (40, 30, 50, 60, 70), NN
 30      CALL PTK41
C
C  DETERMINES IF USER WISHES TO USE COLOR.
C
 35         WRITE (6,620)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
            CALL YORN(IDIC)
            IFRAY(11) = IDIC
            GO TO (90,90,35),IDIC
 40      CALL TEK618
            GO TO 90
 50      CALL COMPRS
            GO TO 35
 60      CALL PRTPLT(72,6)
            GO TO 90
 70      CALL PRTPLT(72,6)
C70      CALL IBM79
            GO TO 90
 90      CONTINUE
      RETURN
C
```

```
C  FORMAT STATEMENTS.
C
 610      FORMAT(//10X,'WHICH GRAPHICS DEVICE ARE YOU GOING TO BE USING?'
     &/15X,'1. TEK618, IBM 3277/TEC 618 DUAL-SCREEN'
     &/15X,'2. TEKTRONIX, ANY MODEL'
     &/15X,'3. COMPRS, USED WITH DISSPOP'
     &/15X,'4. PRTPLT, USED WITH IBM 3278 TERMINAL, OUTPUT FROM THIS '
     &/18X,'DEVICE IS TRASH, BUT IT ALLOWS YOU TO INPUT A GRAPH,'
     &/18X,'AND SAVE IT FOR LATER USE WITH A GRAPHICS TERMINAL.'
     &/15X,'5. IBM79, IBM 3279/COLOR IBM TERMINAL.'
     &)
 620      FORMAT(//10X,'DO YOU WANT THE COLOR FEATURE OF THIS DEVICE?'
     &/10X,'(Y OR N)')
      END
C*****************************************************************
C*****************************************************************
C**** EXAMPL                                                    ****
C****                                                           ****
C****      SUBROUTINE TO DISPLAY CHOICES OF GRAPH ORIENTATION.  ****
C****                                                           ****
C****              VARIABLES AND CONSTANTS                      ****
C****                                                           ****
C****    NN       DETERMINES WHICH PAGE EXAMPLE USER DESIRES.   ****
C****                                                           ****
C*****************************************************************
C*****************************************************************
      SUBROUTINE EXAMPL
C
C  DECLARATIONS.
C
      INTEGER NN
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     & ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
      CALL FRTCMS ('CIRSCRN ')
C
C  DETERMINES HOW THE USER WANTS THE GRAPH DISPLAYED ON THE PAGE.
C
 10   WRITE (6,615)
      CALL REEDIN(NN,&20)
         IF (NN.GT. 0 .AND. NN.LT. 3) GO TO 30
 20         CALL ERROR4 (1,2)
            GO TO 10
C
C  DETERMINES IF USER WISHES TO HAVE AN EXAMPLE PAGE.
C
 30         WRITE (6,620)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
```

```
C
            CALL YORN(IDIC)
            GO TO (35,35,30),IDIC
 35       GO TO (40, 50), NN
 40       CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE VERT DISPLAYS EXAMPLE OF A VERTICAL GRAPH.
C
      CALL VERT(IDIC)
            GO TO 60
 50       CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE HORT DISPLAYS EXAMPLE OF A HORIZONTAL GRAPH.
C
      CALL HORT(IDIC)
            GO TO 60
 60       CONTINUE
      RETURN
C
C  FORMAT STATEMENTS.
C
 615      FORMAT  (/16X,'WHICH DIRECTION OF THE PAGE DO YOU DESIRE? (1 OR
     & 2)'//16X,'                  '/15X,'I',15X,'I'/15X,'I',15X,
     & 'I'/15X,'I',15X,'I'/15X,'I',15X,'I'/15X,'I',15X,'I'/15X,
     & 'I',15X,'I',11X,'                  '/15X,'I',15X,'I',
     & 10X,'I',25X,'I'/15X,'I',15X,'I',10X,'I',25X,'I'/15X,
     &'I   1. VERTICAL   I',10X,'I   2. HORIZONTAL   I'/
     &15X,'I',15X,'I',10X,'I',25X,'I'/15X,'I',15X,'I',10X,'I',25X,'I'
     &/15X,'I',15X,'I',10X,'I',25X,'I'/16X,'______________',12X,
     &')
 620      FORMAT  (/16X,'DO YOU WANT AN EXAMPLE GRAPH TO LOOK AT? (Y OR N
     &)')
      END
C*****************************************************************************
C*****************************************************************************
C****PAGE2D                                                                  ****
C****                                                                       ****
C****       SUBROUTINE TO DETERMINE THE PAGE SIZE FOR                       ****
C****                  TWO-DIMENSIONAL PLOTS.                               ****
C****                                                                       ****
C****                  VARIABLES AND CONSTANTS                              ****
C****                                                                       ****
C****     REIRAY(1,1)     VALUE OF HORIZONTAL PAGE LENGTH.                  ****
C****                                                                       ****
C****     REIRAY(1,2)     VALUE OF VERTICAL PAGE LENGTH.                    ****
C****                                                                       ****
C****     IDIC            USED TO STORE YES OR NO ANSWERS.                  ****
C****                                                                       ****
C****     R               DUMMY VARIABLE USED TO GET USER ANSWER.           ****
```

```
C****                                                                  ****
C**********************************************************************
C**********************************************************************
      SUBROUTINE PAGE2D
C
C  DECLARATIONS.
C
      REAL R
      INTEGER IDIC
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &,ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  INSTRUCTIONS TO USER TO DETERMINE PAGE SIZE.
C
 10   WRITE (6,610)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
        CALL YORN(IDIC)
        GO TO (20,50,10),IDIC
C
C  DETERMINES THE HORIZONTAL PAGE LENGTH.
C
 19   CALL FRTCMS('CLRSCRN ')
 20      WRITE(6,640) RELRAY(1,1)
         WRITE(6,620)
      CALL FEEDRE(R,&25)
         RELRAY(1,1) = R
         GO TO 29
 25      CALL ERROR8
         GO TO 20
C
C  DETERMINES THE VERTICAL PAGE LENGTH.
C
 29   CALL FRTCMS('CLRSCRN ')
 30   WRITE(6,640) RELRAY(1,2)
      WRITE (6,630)
      CALL FEEDRE(R,&35)
         RELRAY(1,2) = R
         GO TO 40
 35      CALL ERROR8
         GO TO 30
 40     CALL FRTCMS ('CLRSCRN ')
 50   RETURN
C
C  FORMAT STATEMENTS.
C
 610     FORMAT(//15X,'****LOOK AT THE DISPLAY SCREEN****'
```

```
     &/10X,'ANSWER THE FOLLOWING QUESTIONS USING THE DISPLAY'
     &/10X,'AS REFERENCE.  BOTH AXES ARE MARKED IN INCHES.'/10X,
     &'THE NORMAL PAGE SIZE IS EITHER (X BY Y):'/
     &13X,'8.5 X 11.0 FOR A VERTICAL PAGE'/
     &13X,'11.0 X 8.5 FOR A HORIZONTAL PAGE'//10X,
     &'DO YOU WISH TO CHANGE THE PAGE SIZE FROM THE ONE SHOWN? (Y OR N)'
     &)
 620    FORMAT(/10X,'WHAT IS THE LENGTH OF YOUR PAGE PARALLEL TO THE X-
     &AXIS IN INCHES?')
 630    FORMAT(/10X,'WHAT IS THE LENGTH OF YOUR PAGE PARALLEL TO THE Y-
     &AXIS IN INCHES?')
 640   FORMAT(/10X,'** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS'
     &,F6.2)
       END
C*************************************************************************
C*************************************************************************
C****  SUBPIT                                                         *****
C****                                                                 ****
C****          SUBROUTINE TO DETERMINE THE TWO-DIMENSIONAL            ****
C****                    SUBPLOT AREA.                                ****
C****                                                                 ****
C****               VARIABLES AND CONSTANTS                           ****
C****                                                                 ****
C****     RELRAY(1,1)     VALUE OF HORIZONTAL PAGE LENGTH.            ****
C****                                                                 ****
C****     RELRAY(1,2)     VALUE OF VERTICAL PAGE LENGTH.              ****
C****                                                                 ****
C****     RELRAY(1,3)     VALUE OF HORIZONTAL SUBPLOT LENGTH.         ****
C****                                                                 ****
C****     RELRAY(1,4)     VALUE OF VERTICAL SUBPLOT LENGTH.           ****
C****                                                                 ****
C****     R               DUMMY REAL VALUE.                           ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE SUBPIT
C
C  DECLARATIONS.
C
      REAL R
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  INSTRUCTS USER ON SUBPLOT AREA AND DETERMINES X-AXIS LENGTH.
C
      WRITE (6,610)
 10   WRITE (6,630) RELRAY(1,3)
      WRITE (6,615)
```

```
      CALL FEEDRE(R,&15)
         IF (R .LT. RELRAY(1,1)) GO TO 20
            CALL ERROR1
               GO TO 10
 15            GO TO 29
 20       RELRAY(1,3) = R
C
C  DETERMINES Y-AXIS LENGTH.
C
 29    CALL FRTCMS('CLRSCRN ')
 30    WRITE (6,630) RELRAY(1,4)
       WRITE (6,620)
       CALL FEEDRE(R,&35)
          IF (R .LT. RELRAY(1,2)) GO TO 40
             CALL ERROR2
               GO TO 30
 35            GO TO 50
 40       RELRAY(1,4) = R
 50    RETURN
C
C  FORMAT STATEMENTS.
C
 610      FORMAT(  //10X,'DISSPLA WILL POSITION THE PLOT ON THE PAGE.'
     &/15X,'(ONE INCH BORDER IS NORMAL)')
 615      FORMAT(/10X,'WHAT IS THE LENGTH OF THE X-AXIS IN INCHES?')
 620      FORMAT(//10X,'WHAT IS THE LENGTH OF THE Y-AXIS IN INCHES?')
 630   FORMAT(/10X,'** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS'
     &,F6.2)
       END
C*****************************************************************
C*****************************************************************
C**** HEADNG                                                   ****
C****                                                          ****
C****          SUBROUTINE REQUESTING GRAPH TITLE.              ****
C****                                                          ****
C****               VARIABLES AND CONSTANTS                    ****
C****                                                          ****
C****     LETRAY(9,2)     TITLE OF GRAPH.                      ****
C****                                                          ****
C****     K               INDEX.                               ****
C****                                                          ****
C****     JJ              NUMBER OF CHARACTERS IN CHARACTER STRING. ****
C****                                                          ****
C*****************************************************************
C*****************************************************************
       SUBROUTINE HEADNG
C
C  DECLARATIONS.
C
```

```
      INTEGER JJ,K
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  ASKS USER THE TITLE OF THIS GRAPH.
C
      CALL CHANGE(2)
 10   WRITE (6,600) (LINE(I),I=1,9)
      WRITE (6,610)
      READ (5,510,END=15) (LETRAY(K,2),K=1,9)
          CALL LETTER(2,JJ)
          IF(JJ .LT. 10) GO TO 20
            CALL ERROR3
            GO TO 10
 15         CALL ERROR8
            GO TO 10
 20   RETURN
C
C  FORMAT STATEMENTS.
C
 510      FORMAT(9A4)
 600      FORMAT(//10X,9A4)
 610      FORMAT(/16X,'WHAT IS THE TITLE OF THIS GRAPH?'/20X,
     & '(32 CHARACTERS MAX)')
      END
C*****************************************************************
C*****************************************************************
C**** XAXIS                                                    ****
C****                                                          ****
C****          SUBROUTINE REQUESTING TITLE OF X-AXIS.          ****
C****                                                          ****
C****               VARIABLES AND CONSTANTS                    ****
C****                                                          ****
C****    LETRAY(9,3)     TITLE OF X-AXIS.                      ****
C****                                                          ****
C****    K               INDEX.                                ****
C****                                                          ****
C****    JJ              NUMBER OF CHARACTERS IN CHARACTER STRING. ****
C****                                                          ****
C*****************************************************************
C*****************************************************************
C*****************************************************************
      SUBROUTINE XAXIS
C
C  DECLARATIONS.
C
      INTEGER JJ,K
      COMMON RELRAY(6,18), INGRAY(7,13), LETRAY(10,24), IFRAY(11)
```

```
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  ASKS USER TITLE OF X-AXIS.
C
      CALL CHANGE(3)
 10   WRITE(6,600) (LINE(I),I=1,9)
      WRITE(6,610)
      READ (5,510,END=15) (LETRAY(K,3),K=1,9)
           CALL LETTER(3,JJ)
           IF (JJ.LT.10) GO TO 20
             CALL ERRCR3
                  GO TO 10
 15           CALL ERRCR8
                  GO TO 10
 20   RETURN
C
C  FORMAT STATEMENTS.
C
 510      FORMAT (9A4)
 600      FORMAT (//10X,9A4)
 610      FORMAT(/16X,'WHAT IS THE NAME OF THE X-AXIS?'/20X,
     & '(32 CHARACTERS MAX) ')
      END
C*************************************************************************
C*************************************************************************
C****  YAXIS                                                          ****
C****                                                                 ****
C****          SUBROUTINE REQUESTING TITLE OF Y-AXIS.                 ****
C****                                                                 ****
C****               VARIABLES AND CONSTANTS                           ****
C****                                                                 ****
C****     LETRAY(9,4)     TITLE OF Y-AXIS.                            ****
C****                                                                 ****
C****     K               INDEX.                                      ****
C****                                                                 ****
C****     JJ              NUMBER OF CHARACTERS IN CHARACTER STRING.    ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE YAXIS
C
C  DECLARATIONS.
C
      INTEGER JJ,K
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,ZPLOT(100), Z(18,100), JCOLOR(25)
C
```

```
C  ASKS USER TITLE OF Y-AXIS.
C
      CAIL CHANGE(4)
 10   WRITE(6,600) (LINE(I),I=1,9)
      WRITE (6,610)
      READ (5,510,END=15) (LETRAY(K,4),K=1,9)
          CALL LETTER(4,JJ)
          IF (JJ.LT.10) GO TO 20
             CALL ERRCR3
               GC TO 10
 15         CALL ERRCR8
               GC TO 10
 20   RETURN
C
C  FORMAT STATEMENTS.
C
 510      FORMAT (9A4)
 600      FORMAT (//10X,9A4)
 610      FORMAT (/16X,'WHAT IS THE NAME OF THE Y-AXIS?'/20X,
     & '(32 CHARACTERS MAX)')
      END
C*****************************************************************
C*****************************************************************
C**** ZAXIS                                                     ****
C****                                                           ****
C****          SUBROUTINE REQUESTING TITLE OF Z-AXIS.           ****
C****                                                           ****
C****               VARIABLES AND CONSTANTS                     ****
C****                                                           ****
C****    LETRAY(9,1)     TITLE OF Z-AXIS.                       ****
C****                                                           ****
C****    K               INDEX.                                 ****
C****                                                           ****
C****    JJ              NUMBER OF CHARACTERS IN CHARACTER STRING. ****
C****                                                           ****
C*****************************************************************
C*****************************************************************
      SUBROUTINE ZAXIS
C
C  DECLARATIONS.
C
      INTEGER JJ,K
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     & ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLCT(100),FILPLT(2)
     &, ZPLCT(100), Z(18,100), JCOLOR(25)
C
C  ASKS USER TITLE OF Z-AXIS.
C
      CAIL CHANGE(1)
```

```
 10    WRITE(6,600) (LINE(I),I=1,9)
       WRITE (6,610)
       READ (5,510,END=15) (LETRAY(K,1),K=1,9)
           CALL LETTER(1,JJ)
           IF (JJ.LT.10) GO TO 20
              CALL ERROR3
                 GO TO 10
 15          CALL ERROR8
                 GO TO 10
 20    RETURN
C
C  FORMAT STATEMENTS.
C
 510      FORMAT (9A4)
 600      FORMAT (//10X,9A4)
 610      FORMAT (/16X,'WHAT IS THE NAME OF THE Z-AXIS?'/20X,
     & '(32 CHARACTERS MAX)')
       END
C*****************************************************************
C*****************************************************************
C**** PATNER                                                   ****
C****                                                          ****
C****     SUBROUTINE REQUESTING THE TYPE OF PATTERN USED IN    ****
C****       DRAWING THE VARIOUS LINES IN THE GRAPH.            ****
C****                                                          ****
C****              VARIABLES AND CONSTANTS                     ****
C****                                                          ****
C****    NN   DUMMY VARIABLES FOR TYPE LINE PATTERN.           ****
C****                                                          ****
C****    LP   THE CURVE FOR WHICH THE LINE PATTERN IS BEING    ****
C****         SELECTED.                                        ****
C****                                                          ****
C*****************************************************************
C*****************************************************************
       SUBROUTINE PATNER (LP)
C
C  DECLARATIONS.
C
       INTEGER NN, LP
       COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     & ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  ASKS USER TYPE OF LINE PATTERN DESIRED.
C
       CALL FRTCMS('CLRSCRN ')
 10    WRITE(6,610)
       CALL REEDIN(NN,&25)
          IF (NN.GT. 0 .AND. NN.LT. 6) GO TO 20
```

```
15          CALL ERRCB4 (1,5)
            GO TO 10
20      LP = NN
        RETURN
25      LP = 1
        RETURN
C
C  FORMAT STATEMENTS.
C
 610      FORMAT(//10X,'WHICH LINE PATTERN DO YOU DESIRE?'
     &/15X,'1. LINE,   ____________________'
     &/15X,'2. DOT,    ....................'
     &/15X,'3. DASH,   --------------------'
     &/15X,'4. CHNDOT, ____..____..____..___'
     &/15X,'5. CHNDSH, ____---____---____---'
     &)
        END
C*************************************************************************
C*************************************************************************
C****                                                                  ****
C****  PAT                                                             ****
C****                                                                  ****
C****        SUBROUTINE THAT EXECUTES THE DESIRED LINE PATTERN.        ****
C****                                                                  ****
C****                                                                  ****
C****              VARIABLES AND CONSTANTS                             ****
C****                                                                  ****
C****     LP   THE CURVE FOR WHICH THE LINE PATTERN IS BEING           ****
C****          SELECTED.                                               ****
C****                                                                  ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE PAT (LP)
C
C  DECLARATIONS.
C
      INTEGER  LP
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100), LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  EXECUTES THE TYPE OF LINE PATTERN DESIRED.
C
      GO TO (10, 20, 30, 40, 50), LP
 10   CALL RESET ('DOT')
      CALL RESET ('DASH')
      CALL RESET ('CHNDOT')
      CALL RESET ('CHNDSH')
         GO TO 90
 20   CALL DOT
```

```
          GO TO 90
 30     CALL DASH
          GO TO 90
 40     CALL CHNDOT
          GO TO 90
 50     CALL CHNDSH
          GO TO 90
 90     RETURN
        END
C*******************************************************************************
C*******************************************************************************
C****  FITTYP                                                                ****
C****                                                                        ****
C****      SUBROUTINE REQUESTING THE TYPE OF CURVE FIT DESIRED               ****
C****            IN DRAWING THE VARIOUS CURVES.                              ****
C****                                                                        ****
C****                VARIABLES AND CONSTANTS                                 ****
C****                                                                        ****
C****    INGRAY(4,LP)   STORES THE TYPE OF CURVE FIT DESIRED                 ****
C****                   BY THE USER.                                         ****
C****                                                                        ****
C****     RELRAY(4,4)   THE AMOUNT OF TENSION USED WITH DISSPLA              ****
C****                   CALL RASPLN.                                         ****
C****                                                                        ****
C****     NN            DUMMY VARIABLE FOR TYPE OF CURVE FIT.                ****
C****                                                                        ****
C****     LP            THE CURVE NUMBER.                                    ****
C****                                                                        ****
C*******************************************************************************
C*******************************************************************************
      SUBROUTINE FITTYP (LP)
C
C  DECLARATIONS.
C
      INTEGER NN, LP
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &  ,X(18,100), Y(18,100),IINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &  ,ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  ASKS USER TYPE OF CURVE INTERPOLATION DESIRED.
C
      CALL FRTCMS('CIRSCRN ')
 10   WRITE(6,610)
      CALL FREEDIN(NN,250)
        IF (NN.GT. 0 .AND. NN.LT. 9) GO TO 20
15        CALL ERRCF4 (1,8)
          GO TO 10
20    INGRAY(4,LP) = NN
      GO TO (40, 40, 29, 40, 40, 40, 40, 40), NN
```

```
      CALL FRTCMS('CLRSCRN ')
      WRITE (6, 620)
      CALL REEDRE(R,&35)
      RELRAY(4,4)= R
         IF (R.GT. 0..AND. R.LT.10.) GO TO 40
35          CALL ERROR4 (0,10)
            GO TO 30
40    RETURN
50    INGRAY(4,LP) = 1
      RETURN
C
C  FORMAT STATEMENTS.
C
 610      FORMAT(//10X,'WHICH CURVE INTERPOLATION METHOD DO YOU DESIRE?'
     &/15X,'1. SPLINE - CUBIC SPLINE.'
     &/15X,'2. LINEAR - STRAIGHT LINE INTERPOLATION.'
     &/15X,'3. RASPLN - RATIONAL SPLINE INTERPOLATION WITH TENSION OF 8.'
     &/15X,'4. POLY3  - 3RD ORDER PARAMETRIC (FOR EVENLY SPACED DATA).'
     &/15X,'5. PARA3  - 3RD ORDER PARAMETRIC (FOR UNEVENLY SPACED DATA).'
     &/15X,'6. POLY5  - 5TH ORDER PARAMETRIC (FOR EVENLY SPACED DATA).'
     &/15X,'7. PARA5  - 5TH ORDER PARAMETRIC (FOR UNEVENLY SPACED DATA).'
     &/15X,'8. STEP   - STEP INTERPOLATION.'
     &/5X,'** NOTE: TO PLOT POINTS ONLY, CHANGE THE FREQUENCY OF THE'
     &/5X,'DATA POINTS TO BE PLOTTED TO  -1.'
     &)
 620      FORMAT(//10X,'HOW MUCH TENSION DO YOU DESIRE? (BETWEEN 0 TO 10)
     &')
      END
C*****************************************************************************
C*****************************************************************************
C****                                                                     ****
C****  FIT                                                                ****
C****                                                                     ****
C****       SUBROUTINE THAT EXECUTES THE DESIRED SMOOTHING METHOD.        ****
C****                                                                     ****
C****                                                                     ****
C****                VARIABLES AND CONSTANTS                              ****
C****                                                                     ****
C****    RELRAY(4,4)  THE AMOUNT OF TENSION USED.                         ****
C****                                                                     ****
C****    NN           DUMMY VARIABLE FOR TYPE OF CURVE FIT.               ****
C****                                                                     ****
C****    LP           THE CURVE NUMBER.                                   ****
C****                                                                     ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE FIT (LP)
C
C  DECLARATIONS.
C
```

```
      INTEGER NN, LP
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  EXECUTES THE TYPE OF CURVE SMOOTHING DESIRED.
C
      NN = INGRAY(4,LP)
      IF (NN.EQ.0) GO TO 10
      GO TO (10, 20, 30, 40, 50, 60, 70, 80), NN
 10   CALL SPLINE
        GO TO 90
 20   CALL LINEAR
        GO TO 90
 30   CALL RASPLN(RELRAY(5,LP))
        GO TO 90
 40   CALL POLY3
        GO TO 90
 50   CALL PARA3
        GO TO 90
 60   CALL POLY5
        GO TO 90
 70   CALL PARA5
        GO TO 90
 80   CALL STEP
        GO TO 90
 90   RETURN
      END
C*****************************************************************************
C*****************************************************************************
C****                                                                     ****
C****  COLOR                                                              ****
C****                                                                     ****
C****     SUBROUTINE THAT EXECUTES THE COLOR SELECTION DESIRED.           ****
C****                                                                     ****
C****                  VARIABLES AND CONSTANTS                            ****
C****                                                                     ****
C****     NN   DUMMY VARIABLE FOR COLOR BEING SELECTED.                   ****
C****                                                                     ****
C****     LP   DUMMY VARIABLE FOR COLOR BEING SELECTED.                   ****
C****                                                                     ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE COLOR(ICOLOR)
C
C  DECLARATIONS.
C
      INTEGER I, LP
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
```

```
     &, ZPICT(100), Z(18,100), JCOLOR(25)
C       IP = 1
CC      IC = ICOLOR
        IF (ICOLOR .NE. 0) GO TO 10
C
C  ASKS USER THE COLOR HE WISHES TO USE.
C
 1      WRITE(6,610)
        CALL REEDIN(NN,&5)
           IF (NN.GT. 0 .AND. NN.LT. 9) GO TO 8
              CALL ERRCR4 (1,8)
              GO TO 1
 5            ICOLOR = 1
        RETURN
 8       ICOLOR = NN
        CALL PRTCMS('CLRSCRN ')
 9      RETURN
 10     IP = ICOLOR
C
C  EXECUTES THE COLOR PEN DESIRED.
C
 11     CALL RESET ('SETCLR')
        GO TO (15, 20, 30, 40, 50, 60, 70, 80), LP
 15     CALL SETCLR ('BLACK')
           GO TO 90
 20     CALL SETCLR ('BLUE')
           GO TO 90
 30     CALL SETCLR ('RED')
           GO TO 90
 40     CALL SETCLR ('YELLOW')
           GO TO 90
 50     CALL SETCLR ('CYAN')
           GO TO 90
 60     CALL SETCLR ('GREEN')
           GO TO 90
 70     CALL SETCLR ('MAGENTA')
           GO TO 90
 80     CALL SETCLR ('WHITE')
           GO TO 90
 90     RETURN
C
C  FORMAT STATEMENTS.
C
 610       FORMAT(//10X,'WHICH COLOR DO YOU WISH USED?'
     &/15X,'1. BLACK'
     &/15X,'2. BLUE'
     &/15X,'3. RED'
     &/15X,'4. YELLOW'
     &/15X,'5. CYAN'
```

```
     &/15X,'6. GREEN'
     &/15X,'7. MAGENTA'
     &/15X,'8. WHITE'
     &)
      END
C*****************************************************************************
C*****************************************************************************
C**** MYSPEC                                                               ****
C****                                                                      ****
C****    SUBROUTINE THAT EXECUTES THE COLOR SELECTION DESIRED.             ****
C****                                                                      ****
C****                 VARIABLES AND CONSTANTS                              ****
C****                                                                      ****
C****    NN   DUMMY VARIABLE FOR TYPE OF CURVE FIT FOR CURVES.             ****
C****                                                                      ****
C****    LP   THE COLOR BEING SELECTED.                                    ****
C****                                                                      ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE MYSPEC(ICURVE)
C
C  DECLARATIONS.
C
      INTEGER I, LP, ICURVE
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     & ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPICT(100), Z(18,100), JCOLOR(25)
 10   LP = JCOLOR(ICURVE)
C
C  EXECUTES THE COLOR PEN DESIRED.
C
 11   CALL RESET ('SETCLR')
      GO TO (15, 20, 30, 40, 50, 60, 70, 80), LP
 15   CALL SETCLR ('BLACK')
        GO TO 90
 20   CALL SETCLR ('BLUE')
        GO TO 90
 30   CALL SETCLR ('RED')
        GO TO 90
 40   CALL SETCLR ('YELLOW')
        GO TO 90
 50   CALL SETCLR ('CYAN')
        GO TO 90
 60   CALL SETCLR ('GREEN')
        GO TO 90
 70   CALL SETCLR ('MAGENTA')
        GO TO 90
 80   CALL SETCLR ('WHITE')
        GO TO 90
```

```
 90    RETURN
       END
C*************************************************************************
C*************************************************************************
C**** STYLE                                                            ****
C****                                                                  ****
C****         SUBROUTINE THAT SELECTS THE LETTERING DESIRED.           ****
C****                                                                  ****
C****                  VARIABLES AND CONSTANTS                         ****
C****                                                                  ****
C****    INGRAY(5,1)    VARIABLE CONTAINING THE TYPE OF LETTERING       ****
C****                   DESIRED BY THE USER.                           ****
C****                                                                  ****
C****     NN            DUMMY VARIABLE FOR TYPE OF CURVE FIT.          ****
C****                                                                  ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE STYLE
C
C  DECLARATIONS.
C
      INTEGER I
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  DISPLAYS TO THE USER THE TYPE LETTERING AVAILABLE.
C
      CALL FRTCMS('CLRSCRN ')
      CALL IETEXM
C
C  ASKS USER THE TYPE OF LETTERING HE WISHES TO USE.
C
 10     WRITE(6,610)
      CALL REEDIN(NN,&15)
         IF (NN.GT. 0 .AND. NN.LT.16) GO TO 20
            CALL ERROR4 (1,15)
            GO TO 10
 15         NN = 1
 20   INGRAY(5,1) = NN
C
C  FORMAT STATEMENTS.
C
 610  FORMAT(//10X,'WHAT IS THE NUMBER FOR THE TYPE LETTERING YOU DESIRE
     &?')
      RETURN
      END
C*************************************************************************
C*************************************************************************
```

```
C**** LETTAR                                                          ****
C****                                                                 ****
C****         SUBROUTINE THAT EXECUTES THE LETTERING SELECTED.        ****
C****                                                                 ****
C****                   VARIABLES AND CONSTANTS                       ****
C****                                                                 ****
C****    INGRAY(5,1)    VARIABLE CONTAINING THE TYPE OF LETTERING      ****
C****                   DESIRED BY THE USER.                          ****
C****                                                                 ****
C****     I             DUMMY VARIABLE FOR TYPE OF CURVE FIT.         ****
C****                                                                 ****
C*********************************************************************
C*********************************************************************
      SUBROUTINE LETTAR
C
C   DECLARATIONS.
C
      INTEGER I
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C   EXECUTES THE LETTERING TYPE DESIRED, THE DEFAULT IS TRIPLX.
C
      I = INGRAY(5,1)
      IF(I.EQ.0) GO TO 7
      GO TO (1,2,3,4,5,6,7,8,9,10,11,12,13,14,15), I
 1    CONTINUE
        GO TO 90
 2    CALL CARTOG
        GO TO 90
 3    CALL SIMPLX
        GO TO 90
 4    CALL SCMPLX
        GO TO 90
 5    CALL COMPLX
        GO TO 90
 6    CALL DUPLX
        GO TO 90
 7    CALL TRIPLX
        GO TO 90
 8    CALL GOTHIC
        GO TO 90
 9    CALL SHDCHR(90.,1,.005,1)
      CALL FUTURA
        GO TO 90
 10   CALL SERIF
        GO TO 90
 11   CALL LOGO1
```

```
          GO TO 90
 12     CALL FASHON
          GO TO 90
 13     CALL SHDCHR(90.,1,.005,1)
        CALL SWISSI
          GO TO 90
 14     CALL SHDCHR(90.,1,.005,1)
        CALL SWISSM
          GO TO 90
 15     CALL SWISSB
          GO TO 90
 90     RETURN
        END
C*******************************************************************************
C*******************************************************************************
C**** MESS                                                                  ****
C****                                                                       ****
C**** SUBROUTINE THAT DETERMINES USER MESSAGE CONTENT AND LOCATION.         ****
C****                                                                       ****
C****                 VARIABLES AND CONSTANTS                               ****
C****                                                                       ****
C****     II              DETERMINES EDITING PHASE.                         ****
C****                                                                       ****
C****     RELRAY(1,1)     VALUE OF HORIZONTAL PAGE LENGTH.                  ****
C****                                                                       ****
C****     RELRAY(1,2)     VALUE OF VERTICAL PAGE LENGTH.                    ****
C****                                                                       ****
C****     RELRAY(4,5)     X-VALUE OF HORIZONTAL LOCATION OF MESSAGE.        ****
C****                                                                       ****
C****     RELRAY(4,6)     Y-VALUE OF VERTICAL LOCATION OF MESSAGE.          ****
C****                                                                       ****
C****     IFRAY(3)        DETERMINES IF USER WANTS A MESSAGE.               ****
C****                                                                       ****
C****     IDIC            USED TO STORE YES OR NO ANSWERS.                  ****
C****                                                                       ****
C****     JJ              THE NUMBER OF LETTERS IN THE MESSAGE.             ****
C****                                                                       ****
C****     R               DUMMY VARAIBLE FOR MESSAGE LOCATION.              ****
C****                                                                       ****
C*******************************************************************************
C*******************************************************************************
      SUBROUTINE MESS(II)
C
C  DECLARATIONS.
C
      REAL R
      INTEGER JJ,K,II,IDIC
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
```

```
     E, ZEICT(100), Z(18,100), JCOLOR(25)
C
      GO TO (10,10,50),II
C  DECISION ON WHETHER OR NOT TO HAVE A MESSAGE.
C
10    WRITE(6,610)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
         CALL YORN(IDIC)
         IFRAY(3) = IDIC
         GO TO (20,70,10),IDIC
20       CALL FRTCMS ('CLRSCRN ')
C
C  ASKS USER FOR HIS MESSAGE CONTENT.
C
      CALL CHANGE(5)
30    WRITE (6,600) (LINE(I),I=1,9)
      WRITE (6,620)
      READ (5,510,END=35) (LETRAY(K,5),K=1,9)
          CALL LETTER(5,JJ)
          IF (JJ.LT.10) GO TO 40
             CALL ERROR3
               GO TO 30
35           CALL ERROR8
               GO TO 30
40    GO TO (49,70),II
C
C  DETERMINES THE LOWER LEFTHAND CORNER OF THE MESSAGE IN INCHES
C  HORIZONTAL.
C
 49   CALL FRTCMS('CLRSCRN ')
      WRITE (6,630)
 50   WRITE (6,650) RELRAY(4,5)
      WRITE (6,635)
      CALL FREDRE(R,855)
      RELRAY(4,5) = R
         IF (RELRAY(1,1).GT. RELRAY(4,5)) GO TO 59
            CALL ERROR1
            GO TO 50
55          CALL ERROR8
            GO TO 50
C
C  DETERMINES THE LOWER LEFTHAND CORNER OF THE MESSAGE IN INCHES
C  VERTICAL.
C
 59   CALL FRTCMS('CLRSCRN ')
 60   WRITE (6,650) RELRAY(4,6)
      WRITE (6,640)
```

```
      CALL REEDRE(R,&65)
      RELRAY(4,6) = R
         IF (RELRAY(1,2).GT. RELRAY(4,6)) GO TO 70
            CALL ERROR2
            GO TO 60
 65         CALL ERROR8
            GO TO 60
 70      CONTINUE
      RETURN
C
C  FORMAT STATEMENTS.
C
 510     FORMAT (9A4)
 600     FORMAT (//10X,9A4)
 610     FORMAT(/10X,'DO YOU WISH TO HAVE A MESSAGE FOR THIS GRAPH? (Y O
     &R N)'
     &/15X,'(I.E. SUBTITLE, FIGURE #, COMMENT,...)')
 620     FORMAT (//16X,'WHAT IS THE MESSAGE? (32 CHARACTERS MAX)')
 630     FORMAT (//10X, 'THE FOLLOWING QUESTIONS DETERMINE THE LOCATION
     &OF THE MESSAGE'/10X,'IN RELATION TO THE AXES ORIGIN.'/)
 635     FORMAT(/10X,'WHAT IS THE X-LOCATION IN INCHES OF THE MESSAGE?')
 640     FORMAT(/10X,'WHAT IS THE Y-LOCATION IN INCHES OF THE MESSAGE?')
 650  FORMAT(/10X,'** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS'
     &,F6.2)
      END
C*****************************************************************
C*****************************************************************
C****LOCIEG                                                      ****
C****                                                            ****
C****      SUBROUTINE REQUESTING LOCATION OF THE LEGEND.         ****
C****                                                            ****
C****              VARIABLES AND CONSTANTS                       ****
C****                                                            ****
C****    RELRAY(1,1) VALUE OF HORIZONTAL PAGE LENGTH.            ****
C****                                                            ****
C****    RELRAY(1,2) VALUE OF VERTICAL PAGE LENGTH.              ****
C****                                                            ****
C****    RELRAY(1,5) LOCATION IN INCHES HORIZONTAL OF THE LOWER  ****
C****                LEFTHAND CORNER OF LEGEND.                  ****
C****                                                            ****
C****    RELRAY(1,6) LOCATION IN INCHES VERTICAL OF THE LOWER    ****
C****                LEFTHAND CORNER OF LEGEND.                  ****
C****                                                            ****
C****    IFRAY(1)    WHETHER OR NOT GRAPH HAS A LEGEND.          ****
C****                                                            ****
C****    IDIC        USED TO STORE YES OR NO ANSWERS.            ****
C****                                                            ****
C****    R           DUMMY VARIABLE FOR LEGEND LOCATION.         ****
C****                                                            ****
```

```
C*************************************************************************
C*************************************************************************
      SUBROUTINE LOCLEG
C
C  DECLARATIONS.
C
      REAL R
      INTEGER IDIC
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  DECISION ON THE LOCATION OF THE LEGEND.
C
10    WRITE(6,610)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
      CALL YORN(IDIC)
      IFRAY(1) = IDIC
      GO TO (20,50,10),IDIC
 20   CALL FRTCMS ('CLRSCRN ')
C
C  DETERMINES THE LOWER LEFTHAND CORNER OF THE LEGEND IN INCHES
C  HORIZONTAL.
C
      WRITE (6,620)
 30   WRITE (6,640) RELRAY(1,5)
      WRITE (6,625)
      CALL FREEDRE(R,&35)
      RELRAY(1,5) = R
         IF (RELRAY(1,1).GT. RELRAY(1,5)) GO TO 39
            CALL ERRCR1
            GO TO 30
 35         CALL ERRCR8
            GO TO 30
C
C  DETERMINES THE LOWER LEFTHAND CORNER OF THE LEGEND IN INCHES
C  VERTICAL.
C
 39   CALL FRTCMS('CLRSCRN ')
 40   WRITE (6,640) RELRAY(1,6)
      WRITE (6,630)
      CALL FREEDRE(R,&45)
      RELRAY(1,6) = R
         IF (RELRAY(1,2).GT. RELRAY(1,6)) GO TO 50
            CALL ERRCR2
            GO TO 40
 45         CALL ERRCR8
```

```
            GO TO 40
 50       CONTINUE
       RETURN
C
C  FORMAT STATEMENTS.
C
 610      FORMAT(/10X,'DO YOU WISH TO HAVE A LEGEND FOR THIS GRAPH?'
     &/15X,'(Y OR N)')
 620      FORMAT (//10X, 'THE FOLLOWING QUESTIONS DETERMINE THE LOCATION
     &OF THE LOWER'/10X,' LEFT CORNER OF THE LEGEND:'/)
 625      FORMAT(/10X,'WHAT IS THE X-POINT IN INCHES OF THIS CORNER?')
 630      FORMAT(//10X,'WHAT IS THE Y-POINT IN INCHES OF THIS CORNER?')
 640   FORMAT(/10X,'** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS'
     &,F6.2)
       END
C*************************************************************************
C*************************************************************************
C****                                                                  ****
C****  XVALUE                                                          ****
C****                                                                  ****
C****          SUBROUTINE SETTING THE SCALE ON THE X-AXIS.             ****
C****                                                                  ****
C****                VARIABLES AND CONSTANTS                           ****
C****                                                                  ****
C****       RELRAY(2,1)   VALUE OF X AT ORIGIN.                        ****
C****                                                                  ****
C****       RELRAY(2,2)   VALUE OF X STEP INTERVAL.                    ****
C****                                                                  ****
C****       RELRAY(2,3)   MAXIMUM VALUE OF X.                          ****
C****                                                                  ****
C****       IFRAY(5)      THE TYPE GRAPH TO BE DEVELOPED.              ****
C****                                                                  ****
C****       ID            DUMMY VARIABLE FOR THE TYPE GRAPH TO BE      ****
C****                     DEVELOPED.                                   ****
C****                                                                  ****
C****       R             DUMMY REAL VARIABLE.                         ****
C****                                                                  ****
C*************************************************************************
C*************************************************************************
       SUBROUTINE XVALUE
C
C  DECLARATIONS.
C
       REAL R
       INTEGER ID
       COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
       ID = IFRAY(5)
       GO TO ( 9,40, 9,40, 9),ID
```

```
C
C  DETERMINES THE VALUE OF X AT THE ORIGIN.
C
 9    WRITE (6,605)
10    WRITE (6,640) RELRAY(2,1)
      WRITE (6,610)
      CALL FEEDRE(R,&15)
         RELRAY(2,1) = R
         GO TO 19
15       CALL ERROR8
         GO TO 10
C
C  DETERMINES THE VALUE OF THE X STEP.
C
19    CALL FRTCMS('CIRSCRN ')
20    WRITE (6,640) RELRAY(2,2)
      WRITE (6,620)
      CALL FEEDRE(R,&25)
         RELRAY(2,2) = R
         GO TO 29
25       CALL ERROR8
         GO TO 20
C
C  DETERMINES THE MAXIMUM VALUE OF X.
C
29    CALL FRTCMS('CIRSCRN ')
30    WRITE (6,640) RELRAY(2,3)
      WRITE (6,630)
      CALL FEEDRE(R,&35)
         RELRAY(2,3) = R
         GO TO 70
35       CALL ERROR8
         GO TO 30
C
C  DETERMINES THE VALUE OF X AT THE ORIGIN F     LOG SCALE.
C
40    WRITE (6,640) RELRAY(2,1)
      WRITE (6,615)
      CALL FEEDRE(R,&45)
         RELRAY(2,1) = R
         IF (R.NE.0.0) GO TO 49
         CALL ERROR4 (0,0)
         GO TO 40
45       CALL ERROR8
         GO TO 40
C
C  DETERMINES THE VALUE OF THE X CYCLE IN INCHES.
C
49    CALL FRTCMS('CIRSCRN ')
```

```
 50    WRITE (6,640) RELRAY(2,2)
       WRITE (6,670)
       CALL REEDRE(R,&55)
          RELRAY(2,2) = R
          GO TO 29
 55       CALL ERROR8
          GO TO 50
 70    CALL FRTCMS('CLRSCRN ')
 71    WRITE (6,680)
          CALL REEDIN(NN,&75)
          IFRAY(6) = NN
          IF (NN .GT. 0 .AND. NN .LT. 3) GO TO 80
 75       CALL ERROR4 (1,2)
          GO TO 71
 80    RETURN
C
C  FORMAT STATEMENTS.
C
 605      FORMAT(//10X,'THE FOLLOWING QUESTIONS DETERMINE THE SCALE OF TH
     &E X-AXIS:')
 610      FORMAT(//15X,'WHAT IS THE VALUE OF X AT THE ORIGIN? (LEFT SIDE)
     &')
 615      FORMAT(//15X,'WHAT IS THE VALUE OF X AT THE ORIGIN? (LEFT SIDE)
     &'/20X,'(MUST BE A NONZERO NUMBER FOR LOG AXIS)')
 620      FORMAT(//15X,'WHAT IS THE X STEP INTERVAL IN YOUR UNITS?')
 630      FORMAT(//15X,'WHAT IS THE MAXIMUM VALUE OF THE Y-AXIS? (RIGHT S
     &IDE)'/20X,'(ANSWER TO THIS QUESTION IS NOT USED FOR LOG AXIS)')
 640   FORMAT(/10X,'** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS'
     &,F10.5)
 670      FORMAT(//15X,'WHAT IS THE X CYCLE LENGTH IN INCHES?')
 680      FORMAT(//15X,'WHICH TYPE OF NUMBERS DO YOU WANT ON THE X-AXIS?'
     &/20X,'1. REAL NUMBERS (I.E. 20.0)'
     &/20X,'2. INTEGER NUMBERS (I.E. 20)')
       END
C*****************************************************************
C*****************************************************************
C****  YVALUE                                                  ****
C****                                                          ****
C****        SUBROUTINE SETTING THE SCALE ON THE Y-AXIS.       ****
C****                                                          ****
C****              VARIABLES AND CONSTANTS                     ****
C****                                                          ****
C****      RELRAY(2,4)  VALUE OF Y AT ORIGIN.                  ****
C****                                                          ****
C****      RELRAY(2,5)  VALUE OF Y STEP INTERVAL.              ****
C****                                                          ****
C****      RELRAY(2,6)  MAXIMUM VALUE OF Y.                    ****
C****                                                          ****
C****      IFRAY(5)     THE TYPE GRAPH TO BE DEVELOPED.        ****
```

```
C****                                                                  ****
C****       ID              DUMMY VARIABLE FOR THE TYPE GRAPH TO BE    ****
C****                       DEVELOPED.                                 ****
C****                                                                  ****
C****       R               DUMMY REAL VARIABLE.                       ****
C****                                                                  ****
C************************************************************************
C************************************************************************
      SUBROUTINE YVALUE
C
C  DECLARATIONS.
C
      REAL R
      INTEGER ID
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPICT(100), Z(18,100), JCOLOR(25)
      ID = IFRAY(5)
      GO TO ( 9, 9,40,40, 9),ID
C
C  DETERMINES THE VALUE OF Y AT THE ORIGIN.
C
 9    CALL FRTCMS('CLRSCRN ')
      WRITE (6,640)
 10   WRITE (6,680) RELRAY(2,4)
      WRITE (6,645)
      CALL REEDRE(R,&15)
         RELRAY(2,4) = R
         GO TO 19
 15      CALL ERROR8
         GO TO 10
C
C  DETERMINES THE VALUE OF THE Y STEP.
C
 19   CALL FRTCMS('CLRSCRN ')
 20   WRITE (6,680) RELRAY(2,5)
      WRITE (6,650)
      CALL REEDRE(R,&25)
         RELRAY(2,5) = R
         GO TO 29
 25      CALL ERROR8
         GO TO 20
C
C  DETERMINES THE MAXIMUM VALUE OF Y.
C
 29   CALL FRTCMS('CLRSCRN ')
 30   WRITE (6,680) RELRAY(2,6)
      WRITE (6,660)
      CALL REEDRE(R,&35)
```

```
          RELRAY(2,6) = R
          GO TO 70
 35       CALL ERROR8
          GO TO 30
C
C  DETERMINES THE VALUE OF Y AT THE ORIGIN FOR THE LOG SCALE.
C
 40    WRITE (6,640)
       WRITE (6,680)  RELRAY(2,4)
       WRITE (6,645)
       CALL REEDRE(R,&45)
          RELRAY(2,4) = R
          IF (R.NE.0.0) GO TO 49
          CALL ERROR4(0,0)
          GO TO 40
 45       CALL ERROR8
          GO TO 40
C
C  DETERMINES THE VALUE OF THE Y CYCLE IN INCHES.
C
 49    CALL FRTCMS('CLRSCRN ')
 50    WRITE (6,680)  RELRAY(2,5)
       WRITE (6,670)
       CALL REEDRE(R,&55)
          RELRAY(2,5) = R
          GO TO 29
 55       CALL ERROR8
          GO TO 50
 70    CALL FRTCMS('CLRSCRN ')
 71    WRITE (6,690)
          CALL REEDIN(NN,&75)
          IFRAY(7) = NN
          IF (NN .GT. 0 .AND. NN .LT. 3) GO TO 80
 75       CALL ERROR4 (1,2)
          GO TO 71
 80    RETURN
C
C  FORMAT STATEMENTS.
C
 640      FORMAT(//10X,'THE FOLLOWING QUESTIONS DETERMINE THE SCALE OF TH
     &E Y-AXIS:'/)
 645      FORMAT(/15X,'WHAT IS THE VALUE OF Y AT THE ORIGIN? (BOTTOM COR
     &NER)')
 615      FORMAT(//15X,'WHAT IS THE VALUE OF Y AT THE ORIGIN? (BOTTOM COR
     &NER'/20X,' (MUST BE A NONZERO NUMBER FOR LOG AXIS)')
 650      FORMAT(//15X,'WHAT IS THE Y STEP INTERVAL IN YOUR UNITS?')
 660      FORMAT(//15X,'WHAT IS THE MAXIMUM VALUE OF THE Y-AXIS? (TOP COR
     &NER)'/20X,' (ANSWER TO THIS QUESTION IS NOT USED FOR LOG AXIS)')
 670      FORMAT(//15X,'WHAT IS THE Y CYCLE LENGTH IN INCHES?')
```

```
 680  FORMAT(/10X,'** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS'
     &,F10.5)
 690      FORMAT(//15X,'WHICH TYPE OF NUMBERS DO YOU WANT ON THE Y-AXIS?'
     &/20X,'1. REAL NUMBERS (I.E. 20.0)'
     &/20X,'2. INTEGER NUMBERS (I.E. 20)')
      END
C*************************************************************************
C*************************************************************************
C****ZVALUE                                                          ****
C****                                                               ****
C****          SUBROUTINE SETTING THE SCALE ON THE Z-AXIS.          ****
C****                                                               ****
C****               VARIABLES AND CONSTANTS                         ****
C****                                                               ****
C****       RELRAY(3,1)  VALUE OF Z AT ORIGIN.                      ****
C****                                                               ****
C****       RELRAY(3,2)  VALUE OF Z STEP INTERVAL.                  ****
C****                                                               ****
C****       RELRAY(3,3)  MAXIMUM VALUE OF Z.                        ****
C****                                                               ****
C****       R            DUMMY REAL VARIABLE.                       ****
C****                                                               ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE ZVALUE
C
C  DECLARATIONS.
C
      REAL R
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPICT(100), Z(18,100), JCOLOR(25)
C
C  DETERMINES THE VALUE OF Z AT THE ORIGIN.
C
      WRITE (6,610)
 10   WRITE (6,640) RELRAY(3,1)
      WRITE (6,615)
      CALL FREEDRE(R,&15)
         RELRAY(3,1) = R
         GO TO 19
 15      CALL ERROR8
         GO TO 10
C
C  DETERMINES THE VALUE OF THE Z STEP.
C
 19   CALL FRTCMS('CLRSCRN ')
 20   WRITE (6,640) RELRAY(3,2)
      WRITE (6,620)
```

```
      CALL REEDRE(R,&25)
         RELRAY(3,2) = R
         GO TO 29
25       CALL ERROR8
         GO TO 20
C
C  DETERMINES THE MAXIMUM VALUE OF Z.
C
29    CALL FRTCMS('CLRSCRN ')
30    WRITE (6,640) RELRAY(3,3)
      WRITE (6,630)
      CALL REEDRE(R,&35)
         RELRAY(3,3) = R
         GO TO 40
35       CALL ERROR8
         GO TO 30
40    CALL FRTCMS('CLRSCRN ')
50    WRITE (6,650)
         CALL REEDIN(NN,&55)
         IFRAY(8) = NN
         IF (NN .GT. 0 .AND. NN .LT. 3) GO TO 60
55       CALL ERROR4 (1,2)
         GO TO 50
60    RETURN
C
C  FORMAT STATEMENTS.
C
610      FORMAT(//10X,'THE FOLLOWING QUESTIONS DETERMINE THE SCALE OF TH
     &E Z-AXIS:'/)
615      FORMAT(/15X,'WHAT IS THE VALUE OF Z AT THE ORIGIN?')
620      FORMAT (///15X,'WHAT IS THE Z STEP INTERVAL IN YOUR UNITS?')
630      FORMAT(//15X,'WHAT IS THE MAXIMUM VALUE OF Z AT THE END?')
640   FORMAT(/10X,'** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS'
     &,F10.5)
650      FORMAT(//15X,'WHICH TYPE OF NUMBERS DO YOU WANT ON THE Z-AXIS?'
     &/20X,'1. REAL NUMBERS (I.E. 20.0)'
     &/20X,'2. INTEGER NUMBERS (I.E. 20)')
      END
C*************************************************************************
C*************************************************************************
C****  GRIDDE                                                         ****
C****                                                                 ****
C****        SUBROUTINE TO DETERMINE THE GRID LINE PATTERN.           ****
C****                                                                 ****
C****              VARIABLES AND CONSTANTS                            ****
C****                                                                 ****
C****     INGRAY(1,5)  NUMBER OF GRID LINES PER X-AXIS.               ****
C****                                                                 ****
C****     INGRAY(1,6)  NUMBER OF GRID LINES PER Y-AXIS.               ****
```

```
C****
C****     IFRAY(4)      WHETHER OR NOT GRAPH HAS GRID LINES.          ****
C****                                                                 ****
C****     IDIC          USED TO STORE YES OR NO ANSWERS.              ****
C****                                                                 ****
C****     INGRAY(5,6)   TYPE OF LINE PATTERN.                         ****
C****                                                                 ****
C****     LP            TYPE OF LINE PATTERN.                         ****
C****                                                                 ****
C****     NN            DUMMY INTEGER VALUE.                          ****
C****                                                                 ****
C*********************************************************************
C*********************************************************************
      SUBROUTINE GRIDDE
C
C  DECLARATIONS.
C
      INTEGER NN, IDIC, LP
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
      IFRAY(4) = 2
C
C  DECISION ON WHETHER OR NOT TO HAVE GRID LINES.
C
 10   WRITE (6,610)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
      CALL YORN(IDIC)
      GO TO (20,60,10),IDIC
 20   IFRAY(4) = 1
C
C  DETERMINES HOW MANY GRID LINES PER X-AXIS STEP INTERVAL.
C
 30   WRITE(5,620)
      CALL REEDIN(NN,&35)
      INGRAY(1,5) = NN
      GO TO 40
 35      CALL ERROR8
         GO TO 30
C
C  DETERMINES HOW MANY GRID LINES PER Y-AXIS STEP INTERVAL.
C
 40   WRITE (6,630)
      CALL REEDIN(NN,&45)
      INGRAY(1,6) = NN
      GO TO 50
 45      CALL ERROR8
```

```
            GO TO 40
C
C  DETERMINES THE LINE PATTERN TO BE USED.
C
 50    CALL PATNER(LP)
         INGRAY(5,6) = LP
 60    CONTINUE
       RETURN
C
C  FORMAT STATEMENTS.
C
 610   FORMAT(//10X,'THE FOLLOWING QUESTIONS PERTAIN TO THE GRID SYSTEM',
     &//12X,'DO YOU WANT THE GRAPH TO HAVE GRID LINES? (Y OR N)')
 620   FORMAT(//12X,'HOW MANY GRID LINES PER X-AXIS STEP INTERVAL?')
 630   FORMAT(//12X,'HOW MANY GRID LINES PER Y-AXIS STEP INTERVAL?')
       END
C*****************************************************************************
C*****************************************************************************
C**** CRVS                                                                  ****
C****                                                                       ****
C****            SUBRCUTINE TO DETERMINE CURVE PLOTS.                       ****
C****                                                                       ****
C****               VARIABLES AND CONSTANTS                                 ****
C****                                                                       ****
C****  RR            DUMMY REAL VALUE.                                      ****
C****                                                                       ****
C****  NN            DUMMY INTEGER VALUE.                                   ****
C****                                                                       ****
C****  INGRAY(2,I)   NUMBER OF POINTS ON THE CURVE.                         ****
C****                                                                       ****
C****  KKK           NUMBER OF POINTS ON THE CURVE.                         ****
C****                                                                       ****
C****  INGRAY(1,4)   NUMBER OF CURVES FOR THIS GRAPH.                       ****
C****                                                                       ****
C****  KK            NUMBER OF CURVES FOR THIS GRAPH.                       ****
C****                                                                       ****
C****  INGRAY(3,I)   NUMBER OF POINTS TO BE PLOTTED FOR THIS GRAPH.         ****
C****                                                                       ****
C****  INGRAY(6,I)   TYPE OF LINE PATTERN FOR EACH CURVE.                   ****
C****                                                                       ****
C****  LETTER(10,I)  TITLE OF EACH CURVE FOR THIS GRAPH.                    ****
C****                                                                       ****
C****  J             WHICH OF THE CURVES IS BEING OPERATED ON.              ****
C****                                                                       ****
C****  JJ            NUMBER OF LETTERS IN THE CURVE TITLE.                  ****
C****                                                                       ****
C****  X(I,JJ)       X-COORDINATE OF A DATA POINT.                          ****
C****                                                                       ****
C****  Y(I,JJ)       Y-COORDINATE OF A DATA POINT.                          ****
```

```
C****                                                                          ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE CRVS
C
C  DECLARATIONS.
C
      REAL RR
      INTEGER J,I,JJ,K,KK,KKK,I,LP,NN
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     C ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCCLOR(25)
C
C  DETERMINES HOW MANY CURVES ARE TO BE PLOTTED.
C
 10   WRITE (6,600)
      CALL REEDIN(NN,&15)
         INGRAY(1,4) = NN
         IF (NN .LT. 1 ) GO TO 160
         IF (NN .LT. 19) GO TO 20
 15           CALL ERROR7
           GO TO 10
 20       KK = INGRAY(1,4)
         CALL FRTCMS ('CLRSCRN ')
C
C  DETERMINES THE TITLE OF EACH CURVE.
C
      DO 150 I=1, KK
      J = 5 +I
 30      WRITE (6,610) I
         READ (5,510,END=35) (IETRAY(K,J),K=1,9)
               CALL LETTER(J,JJ)
               IF (JJ.IT.10) GO TO 40
               CALL ERROR3
               GO TO 30
 35            CALL ERROR8
               GO TO 30
C
C  DETERMINES THE LINE PATTERN TO BE USED.
C
 40   CALL PATNER(LP)
        INGRAY(6,I) = LP
        CALL FRTCMS ('CLRSCRN ')
C
C  DETERMINES WHICH METHOD THE USER WISHES TO USE TO INPUT CURVE DATA.
C
 50      WRITE (6,620)
         CALL REEDIN(NN,&55)
         IF (NN.GT. 0 .AND. NN.LT. 3) GO TO 60
```

```
 55          CALL ERROR4 (1,2)
             GO TO 50
 60          CALL FRTCMS('CLRSCRN ')
             GO TO (70,140),NN
C
C  USER DESIGNATES NUMBER OF DATA PAIRS HE WISHES TO ENTER.
C
 70       WRITE (6,630)
          CALL REEDIN(NN,&75)
               IF (NN.LT. 101) GO TO 80
               CALL ERROR5
                    GO TO 70
 75            CALL ERROR8
                    GO TO 70
 80            INGRAY(2,I) = NN
                  KKK= NN
C
C  USER DESIGNATES NUMBER OF DATA POINTS HE WISHES MARKED.
C
       CALL FRTCMS ('CIRSCRN ')
 90    WRITE (6,636)
          CALL REEDIN(NN,&95)
          INGRAY(3,I) = NN
          IF (IABS(INGRAY(3,I)).LE. KKK) GO TO 100
 95          CALL ERROR4 (-KKK,KKK)
             GO TO 90
C
C  USER INPUTS THE DATA PAIRS.
C
 100            DO 130 JJ=1, KKK
 110       CALL FRTCMS ('CLRSCRN ')
 120            WRITE (6,640) JJ,KKK
                READ (5,*,END=125) X(I,JJ), Y(I,JJ)
                GO TO 130
 125            CALL ERROR8
                GO TO 120
 130            CONTINUE
C
C  SUBROUTINE DATCHK CHECKS CORRECTNESS OF INPUTTED DATA.
C
              CALL DATCHK(I,KKK)
                 GO TO 141
C
C  SUBROUTINE USRFIL INPUTS DATA FROM A USER-DEFINED FILE.
C
 140   IKK = I
              CALL USRFIL (IKK)
                 IF (IKK .EQ. -1) GO TO 30
C
```

```
C  SUBROUTINE DATCHK CHECKS CORRECTNESS OF INPUTTED DATA.
C
C           CALL DATCHK(I,KKK)
C              GO TO 150
  141  CALL CFILE(I)
C
C  DECISION ON WHETHER OR NOT THE USER WANTS THIS CURVE DATA FILED.
C
       CALL FRTCMS ('CIRSCRN ')
  142  WRITE (6,660)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
          CALL YORN(IDIC)
          GO TO (143,150,142),IDIC
  143  CALL FRTCMS('FILEDEF ','3       ','DISK    ',FILPLT  ,'DATA    ')
       REWIND 3
       II = INGRAY(2,I)
       DO 145 JJ=1,II
          WRITE(3,500)X(I,JJ),Y(I,JJ)
  145  CONTINUE
       WRITE (6,650) I,(FILPLT(IX),IX=1,2)
  150     CONTINUE
  160     CONTINUE
       RETURN
C
C  FORMAT STATEMENTS.
C
  500    FORMAT (2E14.5)
  510    FORMAT (9A4)
  600    FORMAT(//10X,'HOW MANY CURVES DO YOU WISH TO PLOT? (0 THRU 18)')
  610    FORMAT(//10X,'WHAT IS THE NAME OF CURVE ',I2,'?'/15X,
     &       '(32 CHARACTERS MAX)')
  620    FORMAT (///10X,'WHICH METHOD DO YOU WISH TO USE TO INPUT DATA FOR
     & THIS CURVE?'/
     &10X,'1. TYPE IN DATA ONE PAIR AT A TIME.'
     &/16X,'2. USE DATA FILE INPUT.')
  630    FORMAT(//10X,'HOW MANY POINTS DO YOU WISH TO PLOT ON THIS CURVE?
     & (100 MAX)')
  636       FORMAT(//30X,'MARKER SYMBOL INFORMATION'/
     &8X,'A POSITIVE NUMBER--POINTS WILL BE CONNECTED AND MARKER SYMBOL
     &S DESIGNATED'
     &/14X,'(*--------*--------*--------*--------*)'
     &/ 8X,'ZERO (0)--POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.'
     &/14X,'(-----------------------------------)'
     &/8X,'A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBO
     &LS ONLY.'
     &/14X,'(*        *        *        *        *)'
     &//10X,'EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND
```

```
     &CCNNECTED'/24X,'EY A LINE)'
     &// 5X,'HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DI
     &SPLAYED?')
 640   FORMAT(//10X,'X-COORDINATE, Y-COORDINATE IN YOUR UNITS,'/13X,
     &'POINT ',I3,' OF ',I3,' POINTS.')
 650   FORMAT(//10X,'**REFERENCE - DATA FOR CURVE',I3,' HAS BEEN FILED U
     &NDER'/13X,2A4,'DATA, THIS FILE WILL NOT NECESSARILY BE UPDATED'
     &/13X,'BUT COULD BE USED TO INPUT CURVE DATA LATER.'
     &//////////////////)
 660   FORMAT(//10X,'DO YOU WANT THIS CURVE DATA FILED FOR YOU? (Y OR N)
     &')
       END
C*************************************************************************
C*************************************************************************
C****  VERT                                                           ****
C****                                                                 ****
C****          SUBROUTINE DISPLAYING THE VERTICAL EXAMPLE             ****
C****            FOR TWO DIMENSIONS.                                  ****
C****                                                                 ****
C****                VARIABLES AND CONSTANTS                          ****
C****                                                                 ****
C****   RELRAY(1,1)  DEFAULT VALUE OF LENGTH OF THE PAGE IN THE X     ****
C****                DIRECTION OF 8.5 INCHES.                         ****
C****                                                                 ****
C****   RELRAY(1,2)  DEFAULT VALUE OF HEIGHT OF THE PAGE IN THE Y     ****
C****                DIRECTION OF 11.0 INCHES.                        ****
C****                                                                 ****
C****   RELRAY(1,3)  DEFAULT VALUE OF LENGTH OF THE SUBPLOT AREA      ****
C****                IN THE X DIRECTION OF 6 INCHES.                  ****
C****                                                                 ****
C****   RELRAY(1,4)  DEFAULT VALUE OF LENGTH OF THE SUBPLOT AREA      ****
C****                IN THE Y DIRECTION OF 8 INCHES.                  ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
       SUBROUTINE VERT(NP)
C
C  DECLARATIONS.
C
       INTEGER IP(600)
       REAL A(2),B(2),C(4),D(4),E(4),F(4)
       COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
       DATA A/0.5,2.5/, B/3.0,7.0/,C/1.5,2.5,3.5,4.5/,
     & D/1.5,2.5,3.5,4.5/, E/0.5,1.0,2.0,3.0/,F/0.5,2.0,4.0,6.0/
       GO TO (5,90),NP
5      ID = IFRAY(5)
       CALL HWROT ('AUTO')
```

```
      CALL PAGE (8.5,11.0)
      CALL HWSCAL ('SCREEN')
      CALL AREA2D (6.0,8.0)
      CALL FRAME
      CALL TRIPLX
C     CALL SWISSL
      CALL THKFRM (.015)
      CALL THKCRV (.02)
      CALL XNAME ('X-AXIS (INCHES)$',100)
      CALL YNAME ('Y-AXIS (INCHES)$',100)
      CALL HEADIN ('EXAMPLE GRAPH$',100,1.5,1)
      CALL MESSAG ('(MESSAGE)$',100,5.0,-.7)
      CALL LINES ('CURVE 1$',IP,1)
      CALL LINES ('CURVE 2$',IP,2)
      CALL LINES ('CURVE 3$',IP,3)
      GO TO (10,20,30,40,10),ID
   10 CALL GRAF (0.0,1.0,6.0,0.0,1.0,8.0)
      REIRAY(2,1) = 0.0
      REIRAY(2,2) = 1.0
      REIRAY(2,3) = 6.0
      REIRAY(2,4) = 0.0
      REIRAY(2,5) = 1.0
      REIRAY(2,6) = 8.0
      GO TO 60
   20 CALL XLOG (0.4,3.0,0.0,1.0)
      REIRAY(2,1) = 0.4
      REIRAY(2,2) = 3.0
      REIRAY(2,3) = 40.
      REIRAY(2,4) = 0.0
      REIRAY(2,5) = 1.0
      REIRAY(2,6) = 8.0
      GO TO 60
   30 CALL YLOG (0.0,1.0,0.1,4.0)
      REIRAY(2,1) = 0.0
      REIRAY(2,2) = 1.0
      REIRAY(2,3) = 10.0
      REIRAY(2,4) = 0.1
      REIRAY(2,5) = 4.0
      REIRAY(2,6) = 10.
      GO TO 60
   40 CALL LOGLOG (0.4,3.0,0.1,4.0)
      REIRAY(2,1) = 0.4
      REIRAY(2,2) = 3.0
      REIRAY(2,3) = 40.
      REIRAY(2,4) = 0.1
      REIRAY(2,5) = 4.0
      REIRAY(2,6) = 10.
      GO TO 60
   60 CONTINUE
```

```
      CALL LEGLIN
      CALL CURVE(A,B,2,0)
      CALL DASH
      CALL CURVE(E,F,4,1)
      CALL CURVE(C,D,4,-1)
      CALL LEGEND (IP,3,3.1,1.1)
      CALL ELREC (3.0,1.,1.5,1.,-2.0)
      CALL DOT
      CALL RESET('THKCRV')
      CALL GRID (1,1)
   80 CONTINUE
      CALL ENDPL (0)
   90 RELRAY(1,1) = 8.5
      RELRAY(1,2) = 11.0
      RELRAY(1,3) = 6.0
      RELRAY(1,4) = 8.0
      RELRAY(4,5) = 5.0
      RELRAY(4,6) = -.7
      RELRAY(1,5) = 3.0
      RELRAY(1,6) = 1.0
      RETURN
      END
C*************************************************************************
C*************************************************************************
C**** HORT                                                           ****
C****                                                                ****
C****      SUBROUTINE DISPLAYING THE HORIZONTAL EXAMPLE FOR          ****
C****                  TWO DIMENSIONS.                               ****
C****                                                                ****
C****              VARIABLES AND CONSTANTS                           ****
C****                                                                ****
C****  RELRAY(1,1) DEFAULT VALUE OF LENGTH OF THE PAGE IN THE X      ****
C****              DIRECTION OF 11.0 INCHES.                         ****
C****                                                                ****
C****  RELRAY(1,2) DEFAULT VALUE OF HEIGHT OF THE PAGE IN THE Y      ****
C****              DIRECTION OF 8.5 INCHES.                          ****
C****                                                                ****
C****  RELRAY(1,3) DEFAULT VALUE OF LENGTH OF THE SUBPLOT AREA       ****
C****              IN THE X DIRECTION OF 8 INCHES.                   ****
C****                                                                ****
C****  RELRAY(1,4) DEFAULT VALUE OF LENGTH OF THE SUBPLOT AREA       ****
C****              IN THE Y DIRECTION OF 6 INCHES.                   ****
C****                                                                ****
C****                                                                ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE HORT(NP)
C
C  DECLARATIONS.
```

```
C
      INTEGER IP(600)
      REAL A(2),B(2),C(4),D(4),E(4),F(4)
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100), LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
      DATA A/0.5,3.0/, B/3.0,5.0/,C/3.5,4.5,5.5,6.5/,
     & D/1.5,2.5,3.5,4.5/, E/0.5,2.0,4.0,5.5/,F/0.5,2.0,4.0,5.5/
      GO TO (5,90),NP
    5 ID = IFRAY(5)
      CALL HWSCAL ('SCREEN')
      CALL PAGE (11.0,8.5)
      CALL AREA2D (8.0,6.0)
      CALL FRAME
      CALL TRIPLX
C     CALL SHDCHR(90.,1,.005,1)
C     CALL SWISSL
      CALL THKFRM (.015)
      CALL THKCRV (.02)
      CALL XNAME ('X-AXIS (INCHES)$',100)
      CALL YNAME ('Y-AXIS (INCHES)$',100)
      CALL HEADIN ('EXAMPLE GRAPH$',100,1.5,1)
      CALL MESSAG ('(MESSAGE)$',100,7.0,-.7)
      CALL LINES ('CURVE 1$',IP,1)
      CALL LINES ('CURVE 2$',IP,2)
      CALL LINES ('CURVE 3$',IP,3)
      GO TO (10,20,30,40,10),ID
   10 CALL GRAF (0.0,1.0,8.0,0.0,1.0,6.0)
      REIRAY(2,1) = 0.0
      REIRAY(2,2) = 1.0
      REIRAY(2,3) = 8.0
      REIRAY(2,4) = 0.0
      REIRAY(2,5) = 1.0
      REIRAY(2,6) = 6.0
      GO TO 60
   20 CALL XLOG (0.4,4.0,0.0,1.0)
      REIRAY(2,1) = 0.4
      REIRAY(2,2) = 4.0
      REIRAY(2,3) = 40.
      REIRAY(2,4) = 0.0
      REIRAY(2,5) = 1.0
      REIRAY(2,6) = 6.0
      GO TO 60
   30 CALL YLOG (0.0,1.0,0.1,3.0)
      REIRAY(2,1) = 0.0
      REIRAY(2,2) = 1.0
      REIRAY(2,3) = 8.0
      REIRAY(2,4) = 0.1
      REIRAY(2,5) = 3.0
```

```
      REIRAY(2,6) = 10.
      GO TO 60
40    CALL LOGLOG (0.4,4.0,0.1,3.0)
      REIRAY(2,1) = 0.4
      REIRAY(2,2) = 4.0
      REIRAY(2,3) = 40.
      REIRAY(2,4) = 0.1
      REIRAY(2,5) = 3.0
      REIRAY(2,6) = 10.
      GO TO 60
60    CONTINUE
      CALL LEGLIN
      CALL CURVE(A,B,2,0)
      CALL DASH
      CALL CURVE(E,F,4,1)
      CALL CURVE(C,D,4,-1)
      CALL LEGEND (IP,3,5.1,1.1)
      CALL ELREC (5.0,1.,1.5,1.,-2.0)
      CALL DOT
      CALL RESET('THKCRV')
      CALL GRID (1,1)
80    CONTINUE
      CALL ENDPL (0)
90    REIRAY(1,1) = 11.0
      REIRAY(1,2) = 8.5
      REIRAY(1,3) = 8.0
      REIRAY(1,4) = 6.0
      REIRAY(4,5) = 7.0
      REIRAY(4,6) = -.7
      REIRAY(1,5) = 5.0
      REIRAY(1,6) = 1.0
      RETURN
      END
C*************************************************************************
C*************************************************************************
C****                                                                 ****
C****  LETEXM                                                         ****
C****                                                                 ****
C****       SUBROUTINE DISPLAYING THE TYPES OF LETTERING              ****
C****                     AVAILABLE.                                  ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE LETEXM
C
C  DECLARATIONS.
C
      DIMENSION IP(800)
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IERAY(11)
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
```

```
      &, ZPLOT(100), Z(18,100), JCOLOR(25)
       CALL RESET ('ALL')
       CALL HWROT ('CCMIC')
       CALL HWSCAL('SCREEN')
       CALL NOBRDR
       CALL PAGE(12.,12.0)
       CALL PHYSOR(2.,1.)
       CALL AREA2D(8.0,10.5)
       CALL SHDCHR(90.,1,.005,1)
       CALL HEIGHT(.25)
       CALL MESSAG('EXAMPLES OF CHARACTER FONTS AVAILIBLE:$',100,.5,9.8)
       CALL HEIGHT(.2)
       CALL MESSAG('1.STANDARD$',100,3.,9.0)
       CALL CARTOG
       CALL MESSAG('2. CARTOG$',100,3.,8.5)
       CALL SIMPLX
       CALL MESSAG('3. SIMPLX$',100,3.,8.)
       CALL SCMPLX
       CALL MESSAG('4. SCMPLX$',100,3.,7.5)
       CALL COMPLX
       CALL MESSAG('5. COMPLX$',100,3.,7.0)
       CALL DUPLX
       CALL MESSAG('6. DUPLX$',100,3.,6.5)
       CALL TRIPLX
       CALL MESSAG('7. TRIPLX$',100,3.,6.)
       CALL GOTHIC
       CALL MESSAG('8. GOTHIC$',100,3.,5.5)
       CALL SHDCHR(90.,1,.005,1)
       CALL FUTURA
       CALL MESSAG('9. FUTURA$',100,3.,5.)
       CALL RESET('SHDCHR')
       CALL SERIF
       CALL MESSAG('10. SERIF$',100,3.,4.5)
       CALL LOGO1
       CALL MESSAG('11. LOGO1$',100,3.,4.0)
       CALL FASHON
       CALL MESSAG('12. FASHON$',100,3.,3.5)
       CALL SHDCHR(90.,1,.005,1)
       CALL SWISSL
       CALL MESSAG('13. SWISSL$',100,3.,3.0)
       CALL SWISSM
       CALL MESSAG('14. SWISSM$',100,3.,2.5)
       CALL RESET('SHDCHR')
       CALL SWISSB
       CALL MESSAG('15. SWISSB$',100,3.,2.0)
       CALL ENDPL(0)
       RETURN
       END
C*******************************************************************************
```

```
C**********************************************************************
C****  PLCT2D                                                        ****
C****                                                                ****
C****                  SUBROUTINE FOR A GRAPH                        ****
C****                    IN TWO-DIMENSIONAL                          ****
C****                      COORDINATES.                              ****
C****                                                                ****
C****                VARIABLES AND CONSTANTS                         ****
C****                                                                ****
C****     RELRAY(1,1)     VALUE OF HORIZONTAL PAGE LENGTH.           ****
C****                                                                ****
C****     RELRAY(1,2)     VALUE OF VERTICAL PAGE LENGTH.             ****
C****                                                                ****
C****     RELRAY(1,3)     VALUE OF HORIZONTAL SUBPLOT LENGTH.        ****
C****                                                                ****
C****     RELRAY(1,4)     VALUE OF VERTICAL SUBPLOT LENGTH.          ****
C****                                                                ****
C****     RELRAY(1,5)     LOCATION IN INCHES HORIZONTAL OF THE LOWER ****
C****                     LEFTHAND CORNER OF LEGEND.                 ****
C****                                                                ****
C****     RELRAY(1,6)     LOCATION IN INCHES VERTICAL OF THE LOWER   ****
C****                     LEFTHAND CORNER OF LEGEND.                 ****
C****                                                                ****
C****     RELRAY(2,1)     VALUE OF X AT ORIGIN.                      ****
C****                                                                ****
C****     RELRAY(2,2)     VALUE OF X STEP INTERVAL.                  ****
C****                                                                ****
C****     RELRAY(2,3)     MAXIMUM VALUE OF X.                        ****
C****                                                                ****
C****     RELRAY(2,4)     VALUE OF Y AT ORIGIN.                      ****
C****                                                                ****
C****     RELRAY(2,5)     VALUE OF Y STEP INTERVAL.                  ****
C****                                                                ****
C****     RELRAY(2,6)     MAXIMUM VALUE OF Y.                        ****
C****                                                                ****
C****     RELRAY(4,5)     X-VALUE OF HORIZONTAL LOCATION OF MESSAGE. ****
C****                                                                ****
C****     RELRAY(4,6)     Y-VALUE OF VERTICAL LOCATION OF MESSAGE.   ****
C****                                                                ****
C****     LETRAY(10,2)    TITLE OF GRAPH.                            ****
C****                                                                ****
C****     LETRAY(10,3)    TITLE OF X-AXIS.                           ****
C****                                                                ****
C****     LETRAY(10,4)    TITLE OF Y-AXIS.                           ****
C****                                                                ****
C****     LETRAY(10,5)    THE MESSAGE USER DESIRES.                  ****
C****                                                                ****
C****     INGRAY(1,4)     NUMBER OF CURVES IN THIS GRAPH.            ****
C****                                                                ****
```

```
C****     INGRAY(1,5)     NUMBER OF GRID LINES PER X-AXIS.                ****
C****                                                                     ****
C****     INGRAY(1,6)     NUMBER OF GRID LINES PER Y-AXIS.                ****
C****                                                                     ****
C****     INGRAY(2,I)     NUMBER OF DATA POINTS TO BE PLOTTED.            ****
C****                                                                     ****
C****     INGRAY(3,I)     NUMBER OF DATA POINTS TO BE MARKED.             ****
C****                                                                     ****
C****     INGRAY(4,I)     TYPE OF CURVE SMOOTHING USED.                   ****
C****                                                                     ****
C****     INGRAY(5,6)     LINE PATTERN USED TO DRAW GRID LINES.           ****
C****                                                                     ****
C****     INGRAY(5,1)     LETTER TYPE TO BE USED.                         ****
C****                                                                     ****
C****     INGRAY(6,I)     LINE PATTERN USED TO DRAW CURVES.               ****
C****                                                                     ****
C****     IFRAY(1)        WHETHER OR NOT GRAPH HAS A LEGEND.              ****
C****                                                                     ****
C****     IFRAY(2)        THE TYPE OF GRAPHIC DEVICE.                     ****
C****                                                                     ****
C****     IFRAY(3)        WHETHER OR NOT GRAPH HAS A MESSAGE.             ****
C****                                                                     ****
C****     IFRAY(4)        WHETHER OR NOT GRAPH HAS GRID LINES.            ****
C****                                                                     ****
C****     IFRAY(5)        THE TYPE GRAPH TO BE DEVELOPED.                 ****
C****                                                                     ****
C****     IFRAY(6)        THE TYPE OF NUMBERS TO BE USED ON X-AXIS.       ****
C****                                                                     ****
C****     IFRAY(7)        THE TYPE OF NUMBERS TO BE USED ON Y- AXIS.      ****
C****                                                                     ****
C****     IFRAY(11)       WHETHER OR NOT USER WANTS COLOR.                ****
C****                                                                     ****
C****     XPLOT           X-COORDINATE OF A DATA POINT.                   ****
C****                                                                     ****
C****     YPLOT           Y-COORDINATE OF A DATA POINT.                   ****
C****                                                                     ****
C****     IDIC            USED TO STORE YES OR NO ANSWERS.                ****
C****                                                                     ****
C****     LINE            DUMMY ARRAY FOR CHARACTER STRINGS.              ****
C****                                                                     ****
C****     K               INDEX.                                          ****
C****                                                                     ****
C****     JJ              NUMBER OF CHARACTERS IN CHARACTER STRING.       ****
C****                                                                     ****
C****     RR              DUMMY REAL VALUE.                               ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE PLOT2D
```

```
C
C   DECLARATIONS.
C
      INTEGER FF1, FF2, FF3, FF4, FF5, FF6, FF9, K, I,IPAK(600),LP,
     & FF7,FF8
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     & ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100),JCOLOR(25)
C
C   FORTRAN REQUIREMENT TO USE A COMPUTED GO TO STATEMENT.
C
          FF1 = IFRAY(1)
          FF2 = IFRAY(2)
          FF3 = IFRAY(3)
          FF4 = IFRAY(4)
          FF5 = IFRAY(5)
          FF6 = INGRAY(1,4)
          FF7 = IFRAY(7)
          FF8 = IFRAY(6)
          FF9 = IFRAY(11)
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW BORDER.
C
      GO TO (1, 9),FF9
 1       WRITE (6,610)
      ICOLOR = 0
         CALL COLOR(ICOLOR)
      JCOLOR(19)=ICOLOR
      DO 2   I = 1, FF6
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN  TO DRAW CURVES.
C
         WRITE(6,620) I
      ICOLOR = 0
         CALL COLOR(ICOLOR)
      JCOLOR(I)=ICOLOR
 2    CONTINUE
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES.
C
         WRITE (6,630)
      ICOLOR = 0
         CALL COLOR(ICOLOR)
      JCOLOR(20)=ICOLOR
 9    CONTINUE
C
C   SUBROUTINE ERRSET REMOVES ERROR MESSAGE FROM DISSPLA EXEC.
C
      CALL RESET ('ALL')
```

```
      CALL ERRSET (208, 256, -1, 1)
C
C  SUBROUTINE HWSCAL DOES THE SCALING OF THE GRAPH ON THE DEVICE.
C
 10   CALL HWSCAL ('SCREEN')
C10   CALL HWSCAL ('NONE')
      CALL UCCHAR
      GO TO (20, 30), FF9
20    CALL SPCMOD
30    CONTINUE
      GO TO (40,50), FF9
40      ICOLOR = JCOLOR(19)
        CALL COLOR(ICOLOR)
 50    CONTINUE
C
C  SUBROUTINE PAGE DEFINES THE PAGE SIZE.
C
      CALL PAGE (RELRAY(1,1),RELRAY(1,2))
C
C  SUBROUTINE HWROT ROTATES THE PAGE TO FIT THE SCREEN.
C
      CALL HWROT ('AUTO')
C
C  SUBROUTINE AREA2D DEFINES THE SUBPLOT AREA.
C
 60   CALL AREA2D (RELRAY(1,3),RELRAY(1,4))
C
C  SUBROUTINE THKFRM DEFINES HOW THICK THE LINE OF THE FRAME WILL BE.
C
      CALL THKFRM (.015)
C
C  SUBROUTINE FRAME FRAMES THE SUBPLOT AREA.
C
      CALL FRAME
 70     CONTINUE
C
C  SUBROUTINE LETTAR DEFINES THE TYPE OF LETTERING.
C
      CALL LETTAR
C
C  SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO D ARRAY TO
C     ONE.
C
      CALL CHANGE (3)
      GO TO (72,71), FF8
C
C  SUBROUTINE XINTAX PUTS INTEGER NUMBERING ON X-AXIS.
C
71    CALL XINTAX
```

```
C
C  SUBROUTINE XNAME INPUTS THE TITLE OF THE X-AXIS.
C
72      CALL XNAME (LINE, 100)
C
C  SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAY TO ONE.
C
        CALL CHANGE (4)
        GO TO (76,75),FF7
C
C  SUBROUTINE YINTAX PUTS INTEGER NUMBERING ON Y-AXIS.
C
75      CALL YINTAX
C
C  SUBROUTINE YNAME INPUTS THE TITLE OF THE Y-AXIS.
C
76      CALL YNAME (LINE, 100)
C
C  SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAY TO ONE.
C
        CALL CHANGE (2)
C
C  SUBROUTINE HEADIN INPUTS THE TITLE OF THE GRAPH.
C
C       CALL HEADIN ('                    $', 100, 1.5, 3 )
        CALL HEADIN ('                    $', 100, 1.5, 2 )
        CALL HEADIN (LINE, 100, 1.5, 2 )
C
C  SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAY TO ONE.
C
        GO TO (80,90),FF3
80      CALL CHANGE (5)
C
C  SUBROUTINE MESSAG INPUTS THE USER'S MESSAGE.
C
        CALL MESSAG (LINE, 100, RELRAY(4,5),RELRAY(4,6))
C
C
C  SUBROUTINE GRAF DEFINES THE PARAMETERS OF THE GRAPH.
C
90      GO TO (100,110,120,130,140),FF5
100     CALL GRAF (RELRAY(2,1), RELRAY(2,2), RELRAY(2,3),RELRAY(2,4),
     &RELRAY(2,5), RELRAY(2,6))
        GO TO 140
110     CALL XLOG (RELRAY(2,1), RELRAY(2,2), RELRAY(2,4),RELRAY(2,5))
        GO TO 140
```

```
120     CALL YLOG (RELRAY(2,1), RELRAY(2,2), RELRAY(2,4),RELRAY(2,5))
        GO TO 140
130     CALL LOGLOG (RELRAY(2,1), RELRAY(2,2), RELRAY(2,4),RELRAY(2,5))
        GO TO 140
140     CONTINUE
C
C   EXECUTES USER'S DICISION ON NUMBER OF CURVES TO BE PLOTTED.
C
        IF (FF6 .EQ. 0) GO TO 200
150     DO 200 I = 1, FF6
C
C   TYPE OF CURVE FITTING EMPLOYED ON ALL CURVES.
C
        CALL FIT(I)
C
C   SUBROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED TO DRAW
C   EACH CURVE.
C
        GO TO (160,170), FF9
 160          CALL MYSPEC(I)
 170    CONTINUE
C
C   ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
C
            LP = INGRAY(6,I)
            CALL PAT(LP)
            CALL RESET ('LEGLIN')
            GO TO (180, 190), FF1
180          IF (INGRAY(3,I).LT. 0) GO TO 190
            CALL LEGLIN
C
C   SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C   ARRAYS TO ONE.
C
190         CALL SWITCH (I,INGRAY(2,I))
C
C   SUBROUTINE CURVE DEFINES ALL THE PARAMETERS FOR EACH CURVE.
C
            CALL CURVE (XPLOT, YPLOT, INGRAY(2,I),INGRAY(3,I))
               IDIM = 5 + I
C
C   SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C   ARRAY TO ONE.
C
            CALL CHANGE (IDIM)
C
C   SUBROUTINE LINES INPUTS THE TITLE OF EACH CURVE INTO THE LEGEND.
C
            CALL LINES (IINE,IPAK,I)
```

```
200    CONTINUE
C
C  SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE LEGEND.
C
       GO TO (201,205),FF9
201    ICCLOR = JCOLOR(19)
          CALL COLOR(ICOLOR)
205    CONTINUE
C
C  EXECUTES THE USER'S DECISION REGARDING A LEGEND.
C
       GO TO (210,220), FF1
C
C  SUBROUTINE LEGEND INPUTS THE PARAMETER FOR THE LEGEND AND PUTS A
C  BOX AROUND THE LEGEND.
C
210    CALL LEGEND (IPAK,INGRAY(1,4), RELRAY(1,5)+.2, RELRAY(1,6)+.2)
          X1 = XLEGND (IPAK, INGRAY(1,4))
          Y1 = YLEGND (IPAK, INGRAY(1,4))
C
C  SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE LEGEND BORDER.
C
       GO TO (211,215),FF9
211    ICCLOR = JCOLOR(19)
          CALL COLOR(ICOLOR)
215    CONTINUE
          CALL BLREC (RELRAY(1,5),RELRAY(1,6), X1+.4, Y1+.4,-2.0)
220    CONTINUE
C
C  SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES.
C
       GO TO (230,240),FF9
230    ICCLOR = JCOLOR(20)
          CALL COLOR(ICOLOR)
240    CONTINUE
C
C  EXECUTES USER'S DECISION REGARDING GRID LINES.
C
       GO TO (250,260),FF4
C
C  SUBROUTINE GRID DEFINES THE PARAMETERS FOR GRID LINES.
C
250       LP = INGRAY(5,6)
          CALL PAT(LP)
          CALL GRID (INGRAY(1,5),INGRAY(1,6))
260    CONTINUE
       CALL RESET ('ALL')
       CALL ENDPL (0)
       RETURN
```

```
C
C  FORMAT STATEMENTS.
C
 610   FORMAT(/18X,'TO DRAW BORDER')
 620   FORMAT(/17X,'TO DRAW CURVE',I3)
 630   FORMAT(/15X,'TO DRAW GRID')
       END
C*************************************************************************
C*************************************************************************
C**** LETTER                                                          ****
C****                                                                 ****
C**** SUBROUTINE WHICH  COUNTS THE NUMBER OF LETTERS AND ADDS THE $.****
C****                                                                 ****
C****              VARIABLES AND CONSTANTS                            ****
C****                                                                 ****
C****   BLANK  INPUTS FOUR BLANK CHARACTERS.                          ****
C****                                                                 ****
C****   DOLLAR INPUTS THE $ CHARACTER.                                ****
C****                                                                 ****
C****   I      THE ELEMENT BEING CONVERTED.                           ****
C****                                                                 ****
C****   JJ     THE NUMBER OF LETTERS.                                 ****
C****                                                                 ****
C****   K      AN INDEX.                                              ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE LETTER (I,JJ)
C
C  DECLARATIONS.
C
      INTEGER I,JJ,K,BLANK, DOLLAR,II,J
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100),LINE(72),YPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPICT(100), Z(18,100), JCOLOR(25)
        DATA BLANK/'    '/,DOLLAR/'$   '/
        DO 10 K = 1, 9
           II=K
           IF(LETRAY(K,I) .EQ. BLANK) GO TO 20
           JJ = K + 1
10      CONTINUE
20         LETRAY(II,I) = DOLLAR
      RETURN
      END
C*************************************************************************
C*************************************************************************
C**** CHANGE                                                          ****
C****                                                                 ****
C****       SUBROUTINE TO EXCHANGE ONE- AND TWO-DIMENSIONAL           ****
```

```
C****                    LETTER ARRAYS.                                  ****
C****                                                                    ****
C****                VARIABLES AND CONSTANTS                             ****
C****                                                                    ****
C****    BLANK  INPUTS FOUR BLANK CHARACTERS.                            ****
C****                                                                    ****
C****    DOLLAR INPUTS THE $ CHARACTER.                                  ****
C****                                                                    ****
C****    IDIM   THE NUMBER OF LETTERS.                                   ****
C****                                                                    ****
C****    J      AN INDEX.                                                ****
C****                                                                    ****
C****    IINE   ONE-DIMENSIONAL ARRAY FOR CHARACTER STRINGS.             ****
C****                                                                    ****
C************************************************************************
C************************************************************************
      SUBROUTINE CHANGE (IDIM)
C
C  DECLARATIONS.
C
      INTEGER DOLLAR, IDIM, BLANK
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
        DATA BLANK/'    '/,DOLLAR/'$   '/
        DO 5 J = 1, 72
           LINE(J) = BLANK
 5      CONTINUE
        DO 10 I = 1, 9
          LINE(I) = IETRAY (I,IDIM)
          IF (LINE(I).EQ.DOLLAR) GO TO 20
 10     CONTINUE
 20     RETURN
        END
C************************************************************************
C************************************************************************
C****  CFILE                                                             ****
C****                                                                    ****
C****        SUBROUTINE TO FILE CURVE DATA FOR USER.                     ****
C****                                                                    ****
C****              VARIABLES AND CONSTANTS                               ****
C****                                                                    ****
C****    IDIM   THE NUMBER OF THE CURVE                                  ****
C****                                                                    ****
C****    FILPLT ONE-DIMENSIONAL ARRAY FOR CHARACTER STRINGS.             ****
C****                                                                    ****
C************************************************************************
C************************************************************************
      SUBROUTINE CFILE (IDIM)
```

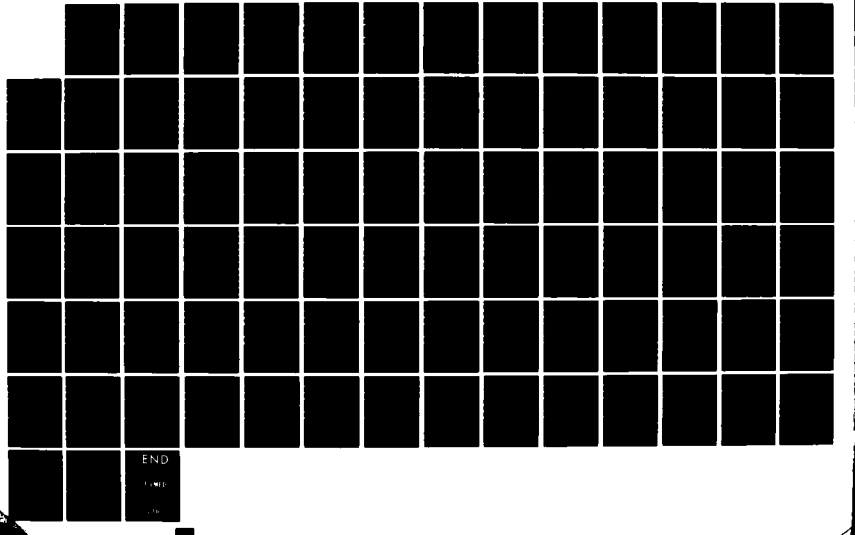
```
C
C   DECLARATIONS.
C
      INTEGER IDIM
      DIMENSION CCUVE(18)
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
        DATA CCUVE/'E01 ','E02 ','E03 ','E04 ','E05 ','E06 ','E07 ',
     &'E08 ','E09 ','E10 ','E11 ','E12 ','E13 ','E14 ','E15 ',
     &'E16 ','E17 ','E18 '/,BL/'CURV'/
           FILPLT(1) = BL
           FILPLT(2) = CCUVE(IDIM)
 10      CONTINUE
 20    RETURN
       END
C*****************************************************************************
C*****************************************************************************
C****  SWITCH                                                                ****
C****                                                                        ****
C****        SUBROUTINE TO EXCHANGE ONE- AND TWO-DIMENSIONAL                 ****
C****                        NUMBER ARRAYS.                                  ****
C****                                                                        ****
C****                VARIABLES AND CONSTANTS                                 ****
C****                                                                        ****
C****  XPLOT ONE-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT.         ****
C****                                                                        ****
C****  YPLOT ONE-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT.         ****
C****                                                                        ****
C****  X     TWO-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT.         ****
C****                                                                        ****
C****  Y     TWO-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT.         ****
C****                                                                        ****
C****  ICUR  THE CURVE NUMBER.                                               ****
C****                                                                        ****
C****  IXY   THE NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE.              ****
C****                                                                        ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE SWITCH (ICUR, IXY)
C
C   DECLARATIONS.
C
      INTEGER IXY, ICUR, I
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
        DO 10 I = 1, IXY
           XPLOT(I) = X(ICUR, I)
```

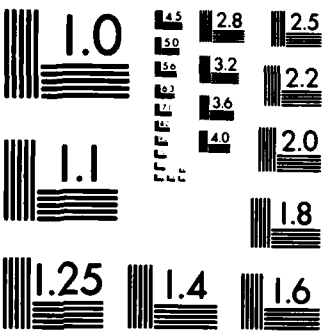
```
            YPLOT(I) = Y(ICUR, I)
            ZPLOT(I) = Z(ICUR, I)
 10       CONTINUE
          RETURN
          END
C*************************************************************************
C*************************************************************************
C**** USRFIL                                                          ****
C****                                                                 ****
C****       SUBROUTINE TO GET FILE FOR USER TO PLOT A CURVE.          ****
C****                                                                 ****
C****              VARIABLES AND CONSTANTS                            ****
C****                                                                 ****
C****  X            TWO-DIMENSIONAL ARRAY FOR X-COORDINATE OF         ****
C****               A DATA POINT.                                     ****
C****                                                                 ****
C****  Y            TWO-DIMENSIONAL ARRAY FOR Y-COORDINATE OF         ****
C****               A DATA POINT.                                     ****
C****                                                                 ****
C****  KK           THE CURVE NUMBER.                                 ****
C****                                                                 ****
C****  INGRAY(2,KK) NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE.    ****
C****                                                                 ****
C****  INGRAY(3,KK) NUMBER OF POINTS TO BE MARKED FOR THIS CURVE.     ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE USRFIL (KK)
C
C  DECLARATIONS.
C
      REAL XY(10,100)
      INTEGER I,K,KK,J
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IERAY(11)
     &,X(18,100), Y(18,100), LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,ZPLOT(100), Z(18,100), JCOLOR(25)
      CALL FRTCMS ('CLRSCRN ')
C
C  GIVES USER INSTRUCTIONS ON HOW TO INPUT HIS FILE.
C
      WRITE (6,600)
C
C  INPUTS THE USER-DEFINED NAME OF DATA FILE.
C
 10     WRITE (6,610)
      READ(5,510,END=15) (FILPLT(I),I=1,2)
      CALL FRTCMS('EXEC    ','CHECK   ',FILPLT  ,NN)
      READ(5,*) NN
      CALL FRTCMS ('CLRSCRN ')
```

```
          IF (NN .EQ. 0) GO TO 20
 11       WRITE(6,660)
          CALL REEDIN(NN,&12)
          IF (NN .GT. 0 .AND. NN .LT. 3) GO TO 13
 12       CALL ERROR4 (1,3)
          GO TO 11
 13       GO TO (10,170,180),NN
       GO TO 20
 15    CALL ERROR8
       GO TO 10
 20    CALL FRTCMS('FILEDEF ','3       ','DISK    ',FILPIT  ,'DATA    ')
       REWIND 3
       CALL FRTCMS ('CIRSCRN ')
 25       WRITE(6,615)
          CALL REEDIN(NN,&28)
          IXF = NN
          IF (NN .GT. 0 .AND. NN .LT. 11) GO TO 29
 28       CALL ERROR4 (1,10)
          GO TO 25
C
C  DETERMINES THE METHOD THE USER WOULD LIKE TO USE TO INPUT HIS DATA;
C  A PAIR AT A TIME OR BY SENTINEL METHOD.
C
 29    CALL FRTCMS ('CIRSCRN ')
 30    WRITE(6,620)
       CALL REEDIN(NN,&35)
          IF (NN.GT. 0 .AND. NN.LT. 3) GO TO 40
 35          CALL ERROR4 (1,2)
             GO TO 30
 40        GO TO (50, 80), NN
C
C  DETERMINES HOW MANY POINTS THE USER WISHES TO INPUT FOR THIS CURVE.
C
 50    WRITE(6,630)
       CALL REEDIN(NN,&55)
          I = NN
          INGRAY(2,KK) = I
          IF(I.LT. 101) GO TO 60
          CALL ERROR5
          GO TO 50
 55       CALL ERROR8
          GO TO 50
 60       DO 70 JY = 1,I
C
C  READS IN THE DATA FROM A USER DEFINED FILE.
C
             READ(3,*) (XY(IX,JY),IX = 1,IXF)
 70       CONTINUE
       GO TO 130
```

AD-A150 779 EASYPLOT: AN INTERACTIVE USER-FRIENDLY GRAPHICS PROGRAM 2/2
(U) NAVAL POSTGRADUATE SCHOOL MONTEREY CA
J C MAINWARING SEP 84

UNCLASSIFIED F/G 9/2 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
C
C  DETERMINES THE SENTINEL VALUE THE USER WANTS TO USE.
C
 80    WRITE (6,640)
       CALL REEDRE(R,&90)
          GO TO 100
 90    CALL ERROR8
          GO TO 80
 100   J = 1
C
C  READS IN THE DATA FROM A USER DEFINED FILE.
C
 110   READ(3,*)  (XY(IX,J),IX = 1,IXF)
       IF (R .EQ. XY(1,J)) GO TO 130
       INGRAY(2,KK) = INGRAY(2,KK) + 1
       IF (J.EQ.100)  GO TO 120
       J = J + 1
       GO TO 110
120    CALL ERROR5
C
C  USER DESIGNATES NUMBER OF DATA POINTS HE WISHES PLOTTED.
C
130    CONTINUE
131       CALL FRTCMS ('CLRSCRN ')
132    WRITE (6,670) KK
       CALL REEDIN(NN,&133)
         IX = NN
         IF (NN .GT. 0 .AND. NN .LE. IXF) GO TO 134
133           CALL ERROR4(1,IXF)
              GO TO 132
134      JYM = INGRAY(2,KK)
         DO 135 JY = 1, JYM
           X(KK,JY) = XY(IX,JY)
135      CONTINUE
       CALL FRTCMS ('CLRSCRN ')
136    WRITE (6,680) KK
       CALL REEDIN(NN,&137)
         IX = NN
         IF (NN .GT. 0 .AND. NN .LE. IXF) GO TO 138
137           CALL ERROR4(1,IXF)
              GO TO 136
138      JYM = INGRAY(2,KK)
         DO 139 JY = 1, JYM
           Y(KK,JY) = XY(IX,JY)
139      CONTINUE
          CALL FRTCMS ('CLRSCRN ')
140    WRITE (6,636)
       CALL REEDIN(NN,&150)
       INGRAY(3,KK) = NN
```

```
      IF (IABS(INGRAY(3,KK)).LE. INGRAY(2,KK)) GO TO 169
         LL= INGRAY(2,KK)
         CALL ERRCB4(-LL,LL)
         GO TO 140
150      CALL ERRCB8
         GO TO 140
169   RETURN
170   KK = -1
      RETURN
180   CALL EXIT1
      RETURN
C
C  FORMAT STATEMENTS.
C
510      FORMAT (2A4)
600      FORMAT(//10X,'NOTE: BEFORE THIS PROGRAM CAN BE USED'
     &/10X,'YOUR DATA FILE MUST BE A FIXED FORMAT FILE, 80 CHARACTERS'
     &/10X,'IN LENGTH, WITH A SPACE OR A COMMA BETWEEN THE VALUES.')
610      FORMAT (/10X,'WHAT IS THE FILENAME FOR THIS FILE?'
     &/10X,'(FILE TYPE MUST BE DATA BUT IS NOT TO BE ENTERED)')
615      FORMAT (/10X,'HOW MANY NUMBERS PER ROW DO YOU HAVE? (10 MAX)')
620      FORMAT(/10X,'HOW WOULD YOU LIKE TO INPUT THESE DATA POINTS?'
     &/10X,'1. BY INPUTTING THE NUMBER OF DATA POINTS YOU WISH TO PLOT.'
     &/10X,'   VALUES WILL BE PLOTTED IN ORDER FROM THE FIRST TO THE LAS
     &T.'
     &/10X,'2. BY INPUTTING A LAST VALUE IN THE FIRST COLUMN OF YOUR DAT
     &A FILE.'/10X,'   THIS VALUE WILL NOT BE PLOTTED AND IS CALLED A SE
     &NTINEL.')
630      FORMAT(//10X,'HOW MANY POINTS DO YOU WISH TO PLOT FROM YOUR FIL
     &E? (100 MAX)')
636      FORMAT(//30X,'MARKER SYMBOL INFORMATION'/
     &/8X,'A POSITIVE NUMBER--POINTS WILL BE CONNECTED AND MARKER SYMBOL
     &S DESIGNATED'
     &/14X,'(*--------*--------*--------*--------*)'
     &/ 8X,'ZERO (0)--POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.'
     &/14X,'(-----------------------------------)'
     &/8X,'A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBO
     &LS ONLY.'
     &/14X,'(*         *         *         *         *)'
     &//10X,'EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND
     &CONNECTED'/24X,'BY A LINE)'
     &// 5X,'HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DI
     &SPLAYED?')
640      FORMAT(//10X,'WHAT IS THE VALUE OF YOUR SENTINEL?'
     &/10X,'NOTE: YOU MUST STILL PUT TWO VALUES IN SENTINEL DATA LINE'
     &/10X,'FIRST VALUE IS THE SENTINEL.')
660      FORMAT(//10X,'"FILE NAME WAS NOT FOUND" PLEASE ENTER ONE OF TH
     &E FOLLOWING NUMBERS'//10X,'1. REENTER THE FILE NAME'
     &/10X,'2. CONTINUE BY ENTERING A NEW CURVE'
```

```
     &/10X,'3. EXIT THE PROGRAM ')
 670     FORMAT (//10X,'WHICH OF THE COLUMNS CONTAINS THE X VALUES FOR C
     &URVE',I3,'?')
 680     FORMAT (//10X,'WHICH OF THE COLUMNS CONTAINS THE Y VALUES FOR C
     &URVE',I3,'?')
       END
C*************************************************************************
C*************************************************************************
C**** FILE                                                            ****
C****                                                                 ****
C****            SUBRCUTINE DEFINING FILE FOR USER.                   ****
C****                                                                 ****
C****               VARIABLES AND CONSTANTS                           ****
C****                                                                 ****
C****    INGRAY     AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS    ****
C****               DISSPLA PARAMETERS.                               ****
C****                                                                 ****
C****    RELRAY     AN ARRAY CONTAINING REAL NUMBERS FOR VARIOUS      ****
C****               DISSPLA PARAMETERS.                               ****
C****                                                                 ****
C****    LETRAY     AN ARRAY CONTAINING CHARACTER STRING              ****
C****               INFORMATION FOR VARIOUS DISSPLA INFORMATION.      ****
C****                                                                 ****
C****    IFRAY      AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS    ****
C****               USER DECISIONS.                                   ****
C****                                                                 ****
C****    X          AN ARRAY CONTAINING THE X VALUES FOR THE          ****
C****               DIFFERENT DATA POINTS.                            ****
C****                                                                 ****
C****    Y          AN ARRAY CONTAINING THE Y VALUES FOR THE          ****
C****               DIFFERENT DATA POINTS.                            ****
C****                                                                 ****
C****    FLTPLT     THE VARIABLE NAME FOR USER FILE DATA.             ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE FILE
C
C  DECLARATIONS.
C
      INTEGER I,K,J,JJ,IPOINT
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  DETERMINES IF THE USER WANTS TO FILE THIS GRAPH.
C
10    WRITE (6,600)
C
```

```
C  DETERMINES YES, NO, OR ERROR, (YES=1,NO=2,ERROR=3).
C
      CALL YORN(IDIC)
      GO TO (20,145,10),IDIC
C
C  DETERMINES THE NAME UNDER WHICH THE USER WANTS THIS DATA FILED.
C
20    WRITE (6,605)
      READ(5,500, END=25) (FILPLT(I),I=1,2)
         GO TO 30
25    CALL ERROR8
         GO TO 20
30    CALL FRTCMS('FILEDEF ','3       ','DISK    ',FILPLT  ,'DATA    ')
      REWIND 3
      IPOINT = 1
      DO 35 JJ = 1, 18
         IF(IPOINT .GT. INGRAY(2,JJ)) GO TO 35
            IPOINT = INGRAY(2,JJ)
35    CONTINUE
C
C  WRITES GRAPH INFORMATION INTO USER DEFINED DATA FILE.
C
      WRITE(3,620) (IFRAY(I),I=1,10)
      DO 40 I = 1, 24
         WRITE (3,630) I,(LETRAY(K,I),K=1,10)
40       CONTINUE
         DO 50 I = 1, 7
            WRITE (3,650) I, (INGRAY(I,K),K=1,6)
50       CONTINUE
         DO 60 I = 1, 6
            WRITE (3,640) I, (RELRAY(I,K),K=1,6)
60       CONTINUE
      DO 70 J = 1, IPOINT
         WRITE(3,640) J, (X(I,J),I=1,6)
         WRITE(3,640) J, (Y(I,J),I=1,6)
         WRITE(3,640) J, (Z(I,J),I=1,6)
70       CONTINUE
      IF(INGRAY(1,4).NE.6) GO TO 140
         DO 80 I = 1, 6
            WRITE (3,650) I, (INGRAY(I,K),K=7,12)
80       CONTINUE
         DO 90 I = 1, 6
            WRITE (3,640) I, (RELRAY(I,K),K=7,12)
90       CONTINUE
      DO 100 J = 1, IPOINT
            L = J+6
         WRITE(3,640) L, (X(I,J),I=7,12)
         WRITE(3,640) L, (Y(I,J),I=7,12)
         WRITE(3,640) L, (Z(I,J),I=7,12)
```

```
  100     CONTINUE
      IF(INGRAY(1,4).IE.12) GO TO 140
         DO 110 I = 1, 6
            WRITE (3,650) I, (INGRAY(I,K),K=13,18)
  110     CONTINUE
         DO 120 I = 1, 6
            WRITE (3,640) I, (RELRAY(I,K),K=13,18)
  120     CONTINUE
      DO 130 J = 1, IPOINT
            L = J+12
         WRITE(3,640) L, (X(I,J),I=13,18)
         WRITE(3,640) L, (Y(I,J),I=13,18)
         WRITE(3,640) L, (Z(I,J),I=13,18)
  130    CONTINUE
  140 WRITE (6,610)  (FILPLT(I),I=1,2)
  145 RETURN
C
C  FORMAT STATEMENTS.
C
  500 FORMAT (2A4)
  600 FORMAT (//10X,'WOULD YOU LIKE THIS GRAPH DATA FILED? (Y OR N)'
     &/10X,'(GRAPH MUST BE FILED TO MAKE A HARD COPY)')
  605 FORMAT (//10X,'UNDER WHAT NAME WOULD YOU LIKE THIS DATA FILED?')
  610 FORMAT (//10X,'THIS DATA HAS BEEN SAVED IN FILE NAMED "',2A4,
     &          '" DATA.'/)
  620 FORMAT(10I5)
  630 FORMAT(I2,10A4)
  640 FORMAT(I4,6E12.5)
  650 FORMAT(I2,6I5)
      END
C*************************************************************************
C*************************************************************************
C**** READ                                                            ****
C****                                                                 ****
C****       SUBROUTINE READING FILE FOR USER TO PLOT A GRAPH.         ****
C****                                                                 ****
C****              VARIABLES AND CONSTANTS                            ****
C****                                                                 ****
C****    INGRAY    AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS     ****
C****              DISSPLA PARAMETERS.                                ****
C****                                                                 ****
C****    RELRAY    AN ARRAY CONTAINING REAL NUMBERS FOR VARIOUS       ****
C****              DISSPLA PARAMETERS.                                ****
C****                                                                 ****
C****    LETRAY    AN ARRAY CONTAINING CHARACTER STRING               ****
C****              INFORMATION FOR VARIOUS DISSPLA PARAMETERS.        ****
C****                                                                 ****
C****    IFRAY     AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS     ****
C****              USER DECISIONS.                                    ****
```

```
C****                                                                  ****
C****     X          AN ARRAY CONTAINING THE X VALUES FOR THE          ****
C****                DIFFERENT DATA POINTS.                            ****
C****                                                                  ****
C****     Y          AN ARRAY CONTAINING THE Y VALUES FOR THE          ****
C****                DIFFERENT DATA POINTS.                            ****
C****                                                                  ****
C****     FILPLT     THE VARIABLE NAME FOR USER FILE DATA.             ****
C****                                                                  ****
C**********************************************************************
C**********************************************************************
      SUBROUTINE REED
C
C  DECLARATIONS.
C
      INTEGER B,I,K,L,L,JJ,IPOINT
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  GETS USER DATA FILE.
C
      CALL FRTCMS('FILEDEF ','3       ','DISK    ', FILPLT  ,'DATA    ')
      REWIND 3
C
C  READS IN THE DATA FROM USER'S FILE TO PLOT OLD GRAPH.
C
      READ(3,510) (IFRAY(I),I=1,10)
      DO 10 I = 1, 24
         READ (3,520) L,(LETRAY(K,I),K=1,10)
10       CONTINUE
         DO 20 I = 1, 7
            READ (3,540) L, (INGRAY(I,K),K=1,6)
20       CONTINUE
      IPOINT = 1
      DO 25 JJ = 1, 18
         IF(IPOINT .GT. INGRAY(2,JJ)) GO TO 25
            IPOINT = INGRAY(2,JJ)
25     CONTINUE
         DO 30 I = 1, 6
            READ (3,550) L, (RELRAY(I,K),K=1,6)
30       CONTINUE
      DO 40 J = 1, IPOINT
         READ(3,530) I, (X(I,J),I=1,6)
         READ(3,530) I, (Y(I,J),I=1,6)
         READ(3,530) I, (Z(I,J),I=1,6)
40       CONTINUE
      IF(INGRAY(1,4).LE.6) GO TO 110
         DO 50 I = 1, 6
```

```
            READ (3,540) L, (INGRAY(I,K),K=7,12)
 50       CONTINUE
          DO 60 I = 1, 6
            READ (3,530) L, (RELRAY(I,K),K=7,12)
 60       CONTINUE
       DO 65 JJ = 1, 18
          IF(IPOINT .GT. INGRAY(2,JJ)) GO TO 65
            IPOINT = INGRAY(2,JJ)
 65     CONTINUE
       DO 70 J = 1, IPOINT
          READ(3,530) I, (X(I,J),I=7,12)
          READ(3,530) I, (Y(I,J),I=7,12)
          READ(3,530) I, (Z(I,J),I=7,12)
 70     CONTINUE
       IF(INGRAY(1,4).IE.12) GO TO 110
          DO 80 I = 1, 6
            READ (3,540) L, (INGRAY(I,K),K=13,18)
 80       CONTINUE
          DO 90 I = 1, 6
            READ (3,530) L, (RELRAY(I,K),K=13,18)
 90       CONTINUE
       DO 95 JJ = 1, 18
          IF(IPOINT .GT. INGRAY(2,JJ)) GO TO 95
            IPOINT = INGRAY(2,JJ)
 95     CONTINUE
       DO 100 J = 1, IPOINT
          READ(3,530) I, (X(I,J),I=13,18)
          READ(3,530) I, (Y(I,J),I=13,18)
          READ(3,530) I, (Z(I,J),I=13,18)
 100      CONTINUE
 110   RETURN
C
C  FORMAT STATEMENTS.
C
 510   FORMAT(10I5)
 520   FORMAT(I2,10A4)
 530   FORMAT(I4,6E12.5)
 540   FORMAT(I2,6I5)
       END
C*****************************************************************************
C*****************************************************************************
C****  FEEDRE                                                              ****
C****                                                                      ****
C****            SUBROUTINE READING REAL VALUES.                           ****
C****                                                                      ****
C****               VARIABLES AND CONSTANTS                                ****
C****                                                                      ****
C****     R       A VARIABLE  CONTAINING THE REAL VALUE.                   ****
C****                                                                      ****
```

```
C*************************************************************************
C*************************************************************************
      SUBROUTINE REEDRE(R,*)
         READ(5,*,END=99) R
         IF (R.EQ.-99.99) CALL EXIT 1
         RETURN
 99      REWIND 5
         RETURN 1
      END
C*************************************************************************
C*************************************************************************
C****                                                                  ****
C****  REEDIN                                                          ****
C****                                                                  ****
C****           SUBROUTINE READING INTEGER VALUES.                     ****
C****                                                                  ****
C****               VARIABLES AND CONSTANTS                            ****
C****                                                                  ****
C****     NN      A VARIABLE  CONTAINING THE INTEGER VALUE.            ****
C****                                                                  ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE REEDIN(NN,*)
         READ(5,*,END=99) R
              IF (R.EQ.-99.99) CALL EXIT 1
              NN = IFIX(R)
         RETURN
 99      REWIND 5
         RETURN 1
      END
C*************************************************************************
C*************************************************************************
C****                                                                  ****
C****  ZERO                                                            ****
C****                                                                  ****
C****           SUBROUTINE TO INITIATE STORAGE ARRAYS.                 ****
C****                                                                  ****
C****                VARIABLES AND CONSTANTS                           ****
C****                                                                  ****
C****     INGRAY     AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS    ****
C****                DISSPLA PARAMETERS.                               ****
C****                                                                  ****
C****     RELRAY     AN ARRAY CONTAINING REAL NUMBERS FOR VARIOUS      ****
C****                DISSPLA PARAMETERS.                               ****
C****                                                                  ****
C****     LETRAY     AN ARRAY CONTAINING CHARACTER STRING              ****
C****                INFORMATION FOR VARIOUS DISSPLA PARAMETERS.       ****
C****                                                                  ****
C****     IFRAY      AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS    ****
C****                USER DECISIONS.                                   ****
C****                                                                  ****
```

```
C****     X          AN ARRAY CONTAINING THE X VALUES FOR THE          ****
C****                DIFFERENT DATA POINTS.                            ****
C****
C****     Y          AN ARRAY CONTAINING THE Y VALUES FOR THE          ****
C****                DIFFERENT DATA POINTS.                            ****
C****
C*************************************************************************
C*************************************************************************
      SUBROUTINE ZERC
C
C  DECLARATIONS.
C
      INTEGER I, J, K, BLANK
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
      DATA BLANK/' '/
C
C  CLEARS WORKING FILE SPACE.
C
      DO 20 I = 1,10
         IFRAY(I) = 0
         DO 10 K = 1, 24
            LETRAY(I,K) = BLANK
10          CONTINUE
20    CONTINUE
      DO 60 I = 1, 6
         DO 40 K = 1, 18
            RELRAY(I,K) = 0.0
40       CONTINUE
60       CONTINUE
         DO 80 I = 1 , 18
         DO 70 J = 1 , 100
            X(I,J) = 0.0
            Y(I,J) = 0.0
            Z(I,J) = 0.0
70       CONTINUE
80    CONTINUE
      DO 100 I = 1, 7
         DO 90 K = 1, 18
            INGRAY(I,K) = 0
90       CONTINUE
100      CONTINUE
      RETURN
      END
C*************************************************************************
C*************************************************************************
C****                                                                  ****
C**** YCRN                                                            ****
C****
```

```
C****        SUBROUTINE TO CHECK THE ANSWER YES OR NO                    ****
C****             RETURNS YES = 1 AND NO = 2.                            ****
C****                                                                    ****
C****                VARIABLES AND CONSTANTS                             ****
C****                                                                    ****
C****    IDIC    THE INTEGER INDEX FOR THE ANSWER YES OR NO.             ****
C****                                                                    ****
C****    LINE    THE DUMMY CHARACTER ARRAY.                              ****
C****                                                                    ****
C************************************************************************
C************************************************************************
      SUBROUTINE YORN (IDIC)
C
C  DECLARATIONS.
C
      INTEGER I,IDIC,YES,NO,EXITA,EXITB,EXITC,EXITD,EXITE,EXITF
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,ZPICT(100), Z(18,100), JCOLOR(25)
      DATA YES/'Y   '/,NO/'N   '/,EXITA/'-   '/,EXITB/'9   '/,
     &EXITC/'9   '/,EXITD/'.   '/,EXITE/'9   '/,EXITF/'9   '/
      IDIC = 3
      READ (5,515,END=20)(LINE(I),I=1,72)
C
C  DETERMINES IF THE ANSWER WAS YES, NO, OR AN ERROR AND ASSIGNS
C  EITHER 1, 2, OR 3 RESPECTIVELY.
C
      DO 10 I = 1, 67
         IF (LINE(I).EQ.YES) IDIC = 1
         IF (LINE(I).EQ.NO) IDIC = 2
         IF (LINE(I).NE.EXITA) GO TO 9
         IF (LINE(I+1).NE.EXITB) GO TO 9
         IF (LINE(I+2).NE.EXITC) GO TO 9
         IF (LINE(I+3).NE.EXITD) GO TO 9
         IF (LINE(I+4).NE.EXITE) GO TO 9
         IF (LINE(I+5).EQ.EXITF) CALL EXIT1
 9       IF (IDIC.NE.3) GO TO 30
 10   CONTINUE
 20   REWIND 5
      CALL ERROR6
 30   RETURN
C
C  FORMAT STATEMENTS.
C
 515  FORMAT(72A1)
      END
C************************************************************************
C************************************************************************
C**** REVISE                                                         ****
```

```
C****                                                                    ****
C****            SUBROUTINE TO REVISE OLD GRAPHS.                        ****
C****                                                                    ****
C************************************************************************
C************************************************************************
      SUBROUTINE REVISE
C
C  DECLARATIONS.
C
      REAL RR
      INTEGER I
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), TITPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  DETERMINES WHICH AREA THE USER WISHES TO UPDATE.
C
 5    CALL FRTCMS ('CIRSCRN ')
 6    WRITE (6,610)
      CALL REEDIN(I,&7)
         IF(I.GT.0 .AND. I .LT. 18) GO TO 9
 7       CALL ERROR4(1,17)
         GO TO 6
 9    CONTINUE
      CALL FRTCMS ('CIRSCRN ')
      GO TO (10,20,30,40,50,60,70,80,90,100,110,120,130,140,150,160,170)
     &,I
C
C  SUBROUTINE PAGE2D WILL UPDATE THE PAGE SIZE OF THE GRAPH.
C
 10   CALL PAGE2D
      GO TO 5
C
C  SUBROUTINE SUBPLT WILL UPDATE THE SIZE OF THE SUBPLOT AREA.
C
 20   CALL SUBPLT
      GO TO 5
C
C  SUBROUTINE HEADNG WILL CHANGE THE TITLE OF THE GRAPH.
C
 30   CALL HEADNG
      GO TO 5
C
C  SUBROUTINE XAXIS WILL CHANGE THE TITLE OF THE X-AXIS.
C
 40   CALL XAXIS
      GO TO 5
C
C  SUBROUTINE YAXIS WILL CHANGE THE TITLE OF THE Y-AXIS.
```

```
C
 50   CALL YAXIS
      GO TO 5
C
C  SUBROUTINE STYLE WILL CHANGE THE TYPE OF LETTERING BEING USED.
C
 60   CALL STYLE
      GO TO 5
C
C  SUBROUTINE MESS WILL UPDATE THE INFORMATION FOR THE MESSAGE.
C
 70   CALL MESS(2)
      GO TO 5
 80   CALL MESS(3)
      GO TO 5
C
C  SUBROUTINE LOCLEG WILL UPDATE THE INFORMATION FOR THE LEGEND.
C
 90   CALL LOCLEG
      GO TO 5
C
C  SUBROUTINE XVALUE WILL UPDATE THE LENGTH INFORMATION ON THE X-AXIS.
C
100   CALL XVALUE
      GO TO 5
C
C  SUBROUTINE YVALUE WILL UPDATE THE LENGTH INFORMATION ON THE Y-AXIS.
C
110   CALL YVALUE
      GO TO 5
C
C  SUBROUTINE GRIDDE WILL UPDATE THE INFORMATION ON THE GRID PATTERN.
C
120   CALL GRIDDE
      GO TO 5
C
C  SUBROUTINE UPCRVS WILL UPDATE THE CURVE INFORMATION.
C
130   CALL UPCRVS
      GO TO 5
C
C  SUBROUTINE CURVS WILL INPUT A COMPLETE NEW SET OF CURVES.
C
140   CALL CRVS
      GO TO 5
C
C  SUBROUTINE HELP1 WILL INSTRUCT USER ON USE OF MENU.
C
150   CALL HELP1
```

```
      GO TO 5
C
C  SUBROUTINE PLOT2D WILL PLOT THE GRAPH TO BE REVISED.
C
160   CALL PLOT2D
      GO TO 5
170   CONTINUE
      CALL FRTCMS ('CIRSCRN ')
      RETURN
C
C  FORMAT STATEMENTS.
C
 010      FORMAT(//10X,'WHICH AREA WOULD YOU LIKE TO UPDATE?'
     &/15X,'1.  PAGE SIZE'
     &/15X,'2.  SUBPICT AREA'
     &/15X,'3.  GRAPH TITLE'
     &/15X,'4.  X-AXIS TITLE'
     &/15X,'5.  Y-AXIS TITLE'
     &/15X,'6.  TYPE LETTERING'
     &/15X,'7.  MESSAGE STATEMENT'
     &/15X,'8.  MESSAGE LOCATION CHANGE'
     &/15X,'9.  LEGEND LOCATION CHANGE'
     &/15X,'10. X-AXIS SCALE'
     &/15X,'11. Y-AXIS SCALE'
     &/15X,'12. GRID'
     &/15X,'13. CHANGE CURVES'
     &/15X,'14. INPUT A COMPLETE NEW SET OF CURVES, THIS CLEARS OLD CURV
     &ES'
     &/15X,'15. HELP'
     &/15X,'16. PLOT THE UPDATED GRAPH'
     &/15X,'17. NO CHANGES')
      END
C*****************************************************************************
C*****************************************************************************
C****  UPCRVS                                                                ****
C****                                                                        ****
C****      SUBROUTINE TO UPDATE DECISIONS ON CURVES AND DATA.                ****
C****                                                                        ****
C****                 VARIABLES AND CONSTANTS                                ****
C****                                                                        ****
C****   INGRAY(2,I)  NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE.          ****
C****                                                                        ****
C****   INGRAY(3,I)  NUMBER OF POINTS TO BE MARKED FOR THIS CURVE.           ****
C****                                                                        ****
C****   INGRAY(6,I)  THE COLOR THAT THIS CURVE IS TO BE DRAWN.               ****
C****                                                                        ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE UPCRVS
```

```
C
C   DECLARATIONS.
C
      REAL RR
      INTEGER J,I,JJ,K,KK,KKK,L,LL
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IERAY(11)
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
10      CALL FRTCMS ('CLRSCRN ')
C
C   DETERMINES WHICH FUNCTION USER WISHES TO PERFORM: UPDATE, ADD,
C   OR DELETE A CURVE.
20    WRITE(6,610)
      CALL REEDIN(NN,&25)
      J = NN
         IF (J .GT. 0 .AND. J  .LT. 6) GO TO 30
25          CALL ERRCR4(1,5)
            GO TO 20
30     GO TO (50,190,40,45,320),J
C
C   DETERMINES WHICH CURVE THE USER WISHES TO DELETE.
C
40    CALL FRTCMS ('CLRSCRN ')
      CALL DCURVE
      CALL FRTCMS ('CLRSCRN ')
      GO TO 20
C
C   SUBROUTINE HELP4 INSTRUCTS THE USER ON THE USE OF THIS MENU.
C
45    CALL FRTCMS ('CLRSCRN ')
      CALL HELP4
      CALL FRTCMS ('CLRSCRN ')
      GO TO 20
C
C   DETERMINES WHICH CURVE THE USER WISHES TO UPDATE.
C
50    CALL FRTCMS ('CLRSCRN ')
60    WRITE (6,620)
      CALL REEDIN(NN,&65)
         I = NN
         IF (I .GT. 0 .AND. I .LT.19) GO TO 70
            CALL ERRCR7
            GO TO 60
65          CALL ERRCR8
            GO TO 60
70    CALL FRTCMS ('CLRSCRN ')
C
C   DETERMINES WHICH AREA OF THE CURVE THE USER WISHES TO UPDATE: TITLE,
C   DATA POINTS, ADD DATA POINTS, DELETE DATA POINTS,
```

```
C  FILE NAME, NUMBER OF DATA POINTS TO BE MARKED, AND
C  PATTERN OF LINE DRAWN.
C
80      WRITE(6,630) I
        CALL REEDIN(NN,&85)
           IF (NN .GT. 0 .AND. NN.LT.11) GO TO 90
85            CALL ERROR4 (1,10)
              GO TO 80
90         J = NN
        CALL FRTCMS ('CIRSCRN ')
         GO TO (110,120,130,140,150,160,170,180,185,10),J
C
C  DETERMINES THE USER'S NEW TITLE FOR THE CURVE.
C
 110       WRITE(5,520) (LETRAY(K,J),K=1,9)
           WRITE (6,640) I
           J = 5 +I
           READ (5,510,END=115) (LETRAY(K,J),K=1,9)
                CALL LETTER(J,JJ)
                IF (JJ.LT.10) GO TO 70
                CALL ERROR3
                GO TO 110
 115            CALL ERROR8
                GO TO 110
C
C  UPDATES THE DATA POINTS FOR THE USER DESIRED CURVE.
C
 120       KKK = INGRAY(2,I)
           CALL DATCHK(I,KKK)
           GO TO 70
C
C  ADDS A DATA POINT TO THE CURVE.
C
 130    CALL APOINT(I)
        CALL FRTCMS ('CIRSCRN ')
        GO TO 70
C
C  DELETES A DATA POINT FROM THE CURVE.
C
 140    CALL DPOINT(I)
        CALL FRTCMS ('CIRSCRN ')
        GO TO 70
C
C  CHANGES THE DATA FILE THE USER WISHES TO USE FOR THAT CURVE.
C
 150       IKK = I
           CALL USRFIL(IKK)
           GO TO 70
C
```

```
C  USER DESIGNATES NUMBER OF DATA POINTS HE WISHES MARKED.
C
160    WRITE (6,634)
       CALL REEDIN(NN,&165)
       INGRAY(3,I) = NN
          IF (IABS(INGRAY(3,I)).LE. INGRAY(2,I)) GO TO 70
             LL = INGRAY(2,I)
             CALL ERROR4(-LL,LL)
             GO TO 160
 165         CALL ERROR8
             GO TO 160
C
C  DETERMINES LINE PATTERN TO BE DRAWN.
C
170    CALL PATNER (LP)
       INGRAY(6,I) = LP
       GO TO 70
C
C  DETERMINES CURVE INTERPOLATION TO BE USED.
C
180    CALL FITTYP (I)
       GO TO 70
C
C  SUBROUTINE HELP5 INSTRUCTS THE USER ON THE USE OF THIS MENU.
C
185    CALL FRTCMS ('CLRSCRN ')
       CALL HELP5
       GO TO 70
C
C  ADDS A CURVE TO THE GRAPH.
C
190      INGRAY(1,4) = INGRAY(1,4) +1
       I = INGRAY(1,4)
       IF(I.LT.19) GO TO 199
       CALL ERROR7
       GO TO 80
199    CALL FRTCMS ('CLRSCRN ')
C
C  DETERMINES THE TITLE OF THE CURVE TO BE ADDED.
C
 200     WRITE (6,640) I
         J = 5 +I
         READ (5,510,END=205) (LETRAY(K,J),K=1,9)
              CALL LETTER(J,JJ)
              IF (JJ.LT.10) GO TO 210
              CALL ERROR3
              GO TO 200
 205          CALL ERROR8
              GO TO 200
```

```
C
C  DETERMINES LINE PATTERN TO BE DRAWN.
C
 210  CALL PATNER (LP)
      INGRAY(6,I) = LP
C
C  DETERMINES THE METHOD THE USER WISHES TO USE TO INPUT DATA FOR THIS
C  NEW CURVE.
C
220       WRITE (6,650)
          CALL REEDIN(NN,&225)
             IF (NN.EQ.1 .OR. NN.EQ.2) GO TO 230
225             CALL ERROR4(1,2)
                GO TO 220
230          GO TO (240,300),NN
C
C  DETERMINES HOW MANY POINTS THE USER WISHES TO PLOT.
C
240       WRITE (6,660)
          CALL REEDIN(NN,&245)
               IF (NN .LT. 100.) GO TO 250
               CALL ERROR5
                    GO TO 240
245            CALL ERROR8
                    GO TO 240
250            INGRAY(2,I) = NN
C
C  DESIGNATES NUMBER OF DATA POINTS USER WISHES MARKED ON GRAPH.
C
          CALL FRTCMS ('CLRSCRN ')
260     WRITE (6,634)
        CALL REEDIN(NN,&265)
        INGRAY(3,I) = NN
           IF (IABS(INGRAY(3,I)).LE. INGRAY(2,I)) GO TO 270
              LL= INGRAY(2,I)
              CALL ERROR4(-LL,LL)
              GO TO 260
265           CALL ERROR8
              GO TO 260
C
C  INPUTS THE DATA POINTS A PAIR AT A TIME FROM THE TERMINAL.
C
270              KKK= INGRAY(2,I)
              DO 290 JJ=1, KKK
                 CALL FRTCMS ('CLRSCRN ')
280              WRITE (6,670) JJ,KKK
                 READ (5,*,END=285) X(I,JJ), Y(I,JJ)
                      GO TO 290
285                   CALL ERROR8
```

```
                        GO TO 280
290             CONTINUE
C
C  SUBROUTINE DATCHK WILL ALLOW USER TO VERIFY HIS DATA.
C
                CALL DATCEK(I,KKK)
                   GO TO 10
C
C  SUBROUTINE USRFIL READS USER DESIGNATED FILE FOR DATA POINTS.
C
300         IKK = I
301             CALL USRFIL (IKK)
                   IF(IKK .EQ. -1) GO TO 199
                CALL DATCHK(I,KKK)
                   GO TO 10
C310          CCNTINUE
320           CONTINUE
         RETURN
C
C  FORMAT STATEMENTS.
C
 510         FORMAT  (9A4)
 520         FORMAT  (//5X,9A4)
 610         FORMAT(//10X,'WHICH OF THE FOLLOWING DO YOU WISH TO PERFORM?'
     &/15X,'1.   UPDATE AN EXISTING CURVE?'
     &/15X,'2.   ADD A CURVE?'
     &/15X,'3.   DELETE A CURVE?'
     &/15X,'4.   HELP?'
     &/15X,'5.   TERMINATE EDITING?')
 620         FORMAT(//10X,'WHICH CURVE DO YOU WISH TO UPDATE? (1 THRU 18)')
 630         FORMAT(//10X,'WHICH AREA OF THIS CURVE',I2,
     &' DO YOU WISH TO UPDATE?'
     &/15X,'1.  CURVE TITLE.'
     &/15X,'2.  CHECK DATA POINTS.'
     &/15X,'3.  ADD A DATA POINT.'
     &/15X,'4.  DELETE A DATA POINT.'
     &/15X,'5.  CHANGE FILE NAME OF DATA POINTS.'
     &/15X,'6.  CHANGE THE NUMBER OF DATA POINTS TO BE MARKED.'
     &/15X,'7.  CHANGE THE LINE PATTERN TO BE DRAWN.'
     &/15X,'8.  CHANGE THE TYPE OF CURVE INTERPOLATION USED.'
     &/15X,'9.  HELP.'
     &/15X,'10.  TERMINATE EDITING ON THIS CURVE.')
 634         FORMAT(//30X,'MARKER SYMBOL INFORMATION'/
     &/8X,'A POSITIVE NUMBER--POINTS WILL BE CONNECTED AND MARKER SYMBOL
     &S DESIGNATED'
     &/14X,'(*--------*--------*--------*--------*)'
     &/ 8X,'ZERO (0)--POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.'
     &/14X,'(-----------------------------------)'
     &/3X,'A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBO
```

```
     &LS ONLY.'
     &/14X,'(*          *          *          *          *)'
     &//10X,'EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND
     &CONNECTED'/24X,'BY A LINE)'
     &// 5X,'HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DI
     &SPLAYED?')
 640    FORMAT(//10X,'WHAT IS THE NEW TITLE OF CURVE',I2,' ?'/15X,
     &              '(32 CHARACTERS MAX)')
 650        FORMAT (///10X,'WHICH METHOD DO YOU WISH TO USE TO INPUT T
     &HIS CURVES DATA?'/
     &16X,'1.TYPE IN DATA ONE PAIR AT A TIME.'
     &/16X,'2. USE DATA FILE INPUT.')
 660    FORMAT(//10X,'HOW MANY POINTS DO YOU WISH TO PLOT ON THIS CURVE
     &? (100 MAX)')
 670    FORMAT(//10X,'X-COORDINATE, Y-COORDINATE IN YOUR UNITS,'/13X,
     &'POINT ',I3,' OF ',I3,' POINTS.')
      END
C*****************************************************************
C*****************************************************************
C**** DATCHK                                                    ****
C****                                                           ****
C****      SUBROUTINE TO VERIFY DATA FOR EACH GRAPH.            ****
C****                                                           ****
C****              VARIABLES AND CONSTANTS                      ****
C****                                                           ****
C****  X      2-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT. ****
C****                                                           ****
C****  Y      2-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT. ****
C****                                                           ****
C****  I      THE CURVE NUMBER.                                 ****
C****                                                           ****
C****  J      THE NUMBER OF POINTS TO BE CHECKED FOR THIS CURVE.  ****
C****                                                           ****
C****  LINE   ONE-DIMENSIONAL ARRAY FOR CHARACTER STRINGS.       ****
C****                                                           ****
C*****************************************************************
C*****************************************************************
      SUBROUTINE DATCHK (I,J)
C
C  DECLARATIONS.
C
      REAL FR
      INTEGER J,I,IDIC,NN,II,KK,K
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     & ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
      KK = 5
      K = 1
 10   CALL FRTCMS ('CIRSCRN ')
```

```
C
C  DETERMINES IF THE USER WISHES TO CONTINUE TO UPDATE DATA.
C
      CALL FRTCMS ('CIRSCRN ')
 20   WRITE (6,600) I
C
C  SUBROUTINE YORN DETERMINES IF THE ANSWER WAS YES, NO, OR ERROR.
C
        CALL YORN(IDIC)
        GO TO (30,110,20), IDIC
C
C  PRINTS ON THE SCREEN FIVE DATA POINTS AT A TIME FOR THE USER
CTO CHECK.
C
 30   WRITE (6,610) I
 40   DO 50 NN = K, KK
        WRITE (6,620) NN, X(I,NN), Y(I,NN)
 50   CONTINUE
C
C  DETERMINES FROM THE USER IF THESE DATA POINTS ARE CORRECT.
C
 60   WRITE (6,630) I
C
C  SUBROUTINE YORN DETERMINES IF THE ANSWER WAS YES, NO, OR ERROR.
C
      CALL YORN (IDIC)
        GO TO (90,70,30), IDIC
C
C  DETERMINES WHICH PAIR THE USER WISHES TO CHANGE.
C
 70       WRITE (6,640)
          CALL REEDIN(NN,&75)
               II = NN
               IF (II.LT.K.OR.II.GT.KK) GO TO 85
               IF(II.EQ.J) GO TO 80
                  CALL ERROR4(K,J)
                  GO TO 30
 75               CALL ERROR8
                  GO TO 70
C
C  DETERMINES THE DATA TO BE UPDATED FROM THE USER.
C
 80       WRITE (6,650)
          READ (5,*,END=100) X(I,II), Y(I,II)
          CALL FRTCMS ('CLRSCRN ')
               GO TO 30
 85       CALL ERROR4(K,KK)
             GO TO 70
 90    IF(KK.GE.J) GO TO 110
```

```
            K = KK + 1
            KK = KK + 5
            CALL FRTCMS ('CLRSCRN ')
            GO TO 30
  100       CALL ERROR8
            GO TO 80
  110   RETURN
C
C   FORMAT STATMENTS.
C
  600     FORMAT(//6X,'DO YOU WISH TO CHECK THE DATA INPUT FOR CURVE',
     &I2,' ? (Y OR N)')
  610     FORMAT (/14X,'CURVE NUMBER',I2
     &/10X,'X-VALUE',7X,'Y-VALUE')
  620     FORMAT(5X,I3,2X,1PE12.5,3X,1PE12.5)
  630     FORMAT(/10X,'ARE THESE DATA POINTS CORRECT FOR CURVE',I2,
     &' ? (Y OR N)')
  640       FORMAT(/10X,'WHICH X-Y PAIR DO YOU WISH TO CHANGE? (INPUT #
     & OF POINT)')
  650       FORMAT(/10X,'INPUT NEW X-COORDINATE, Y-COORDINATE')
        END
C*************************************************************************
C*************************************************************************
C**** DPOINT                                                          ****
C****                                                                 ****
C****          SUBROUTINE TO DELETE A DATA POINT.                     ****
C****                                                                 ****
C****               VARIABLES AND CONSTANTS                           ****
C****                                                                 ****
C****   X             TWO-DIMENSIONAL ARRAY FOR X-COORDINATE OF A     ****
C****                 DATA POINT.                                     ****
C****                                                                 ****
C****   Y             TWO-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A     ****
C****                 DATA POINT.                                     ****
C****                                                                 ****
C****   IC            THE CURVE NUMBER.                               ****
C****                                                                 ****
C****   INGRAY(2,KK)  NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE.  ****
C****                                                                 ****
C****   JD            NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE.  ****
C****                                                                 ****
C****                                                                 ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE DPOINT (IC)
C
C   DECLARATIONS.
C
```

```
      INTEGER I, IC, JD, N, II, J
      REAL F
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     C ,X(18,100), Y(18,100), LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
10    WRITE (6,610)
      JD = INGRAY(2,IC)
      DO 20 I = 1, JD
         WRITE (6,620) I, X(IC,I), Y(IC,I)
20    CONTINUE
C
C  DETERMINES IF USER STILL WISHES TO DELETE A POINT.
C
30    WRITE (6,630)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
         CALL YORN(IDIC)
      CALL FRTCMS ('CIRSCRN ')
         GO TO (40,70,30),IDIC
C
C  DETERMINES WHICH POINT THE USER WANTS DELETED AND EXECUTES.
C
40    WRITE (6,640)
         CALL REEDIN(NN,&45)
            N = NN
            IF (N .GT. 0 .AND. N .LE. JD ) GO TO 50
            CALL ERROR4(1,JD)
               GO TO 40
45          CALL ERROR8
               GO TO 40
50          II = INGRAY(2,IC)
      DO 60 J = N, II
         X(IC,J-1) = X(IC,J)
         Y(IC,J-1) = Y(IC,J)
60       CONTINUE
      INGRAY(2,IC) = II - 1
      X(IC,II) = 0.0
      Y(IC,II) = 0.0
70    RETURN
C
C   FORMAT STATEMENTS.
C
610   FORMAT(//10X,'THIS IS A CURRENT LISTING OF YOUR DATA POINTS, FIVE
     & AT A TIME.'
     & /10X,'NUMBER',10X,'X VALUE',10X,'Y VALUE'/)
620   FORMAT (/12X, I3,5X,1PE12.5,5X,1PE12.5)
630   FORMAT (//10X,'DO YOU STILL WISH TO DELETE A POINT? (Y OR N)')
```

```
 640  FORMAT (//10X,'INPUT THE NUMBER OF THE POINT YOU WISH TO DELETE.')
      END
C*****************************************************************************
C*****************************************************************************
C**** DCURVE                                                                ****
C****                                                                       ****
C****                SUBROUTINE TO DELETE A CURVE.                          ****
C****                                                                       ****
C****                 VARIABLES AND CONSTANTS                               ****
C****                                                                       ****
C****  X               TWO-DIMENSIONAL ARRAY FOR X-COORDINATE OF A           ****
C****                  DATA POINT.                                          ****
C****                                                                       ****
C****  Y               TWO-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A           ****
C****                  DATA POINT.                                          ****
C****                                                                       ****
C****  LETRAY(10,I)    THE TITLE OF THE CURVE.                               ****
C****                                                                       ****
C****  INGRAY(1,4)     NUMBER OF CURVES IN THIS GRAPH.                       ****
C****                                                                       ****
C****                                                                       ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE DCURVE
C
C  DECLARATIONS.
C
      INTEGER I, N, NN, J, II, IDIC
      REAL R
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     & ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  DETERMINES IF USER STILL WISHES TO DELETE A CURVE.
C
 5    WRITE (6,610)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
         CALL YORN(IDIC)
      CALL FRTCMS ('CLRSCRN ')
         GO TO (10,60, 5),IDIC
C
C  DETERMINES WHICH CURVE THE USER WISHES TO DELETE.
C
 10   WRITE (6,620)
         CALL REEDIN(N,815)
            NN = N
            IF (INGRAY(1,4) .EQ. 0) GO TO 60
```

```
          IF (N .GT. 0 .AND. N .LE. INGRAY(1,4)) GO TO 20
          CALL ERROR4(1,INGRAY(1,4))
             GO TO 10
15        CALL ERROR8
             GO TO 10
20        II = INGRAY(1,4) - 1
      DO 35 J = N, II
         INGRAY(2,J) = INGRAY(2,N+1)
         INGRAY(3,J) = INGRAY(3,N+1)
         INGRAY(4,J) = INGRAY(4,N+1)
         INGRAY(6,J) = INGRAY(6,N+1)
         DO 30 I = 1, 100
             X(J,I) = X(J+1,I)
             Y(J,I) = Y(J+1,I)
30       CONTINUE
35    CONTINUE
         DO 50 J = NN, II
             DO 40 I = 1,10
                 LETRAY(I,J+5) = LETRAY(I, J+6)
40           CONTINUE
50       CONTINUE
      INGRAY(1,4) = II
60    RETURN
C
C   FORMAT STATEMENTS.
C
610   FORMAT (//10X,'DO YOU STILL WISH TO DELETE A CURVE? (Y OR N)')
620   FORMAT (//10X,'INPUT THE NUMBER OF THE CURVE YOU WISH TO DELETE.')
      END
C*****************************************************************
C*****************************************************************
C**** APOINT                                                    ****
C****                                                           ****
C****          SUBROUTINE TO ADD A DATA POINT.                  ****
C****                                                           ****
C****               VARIABLES AND CONSTANTS                     ****
C****                                                           ****
C****  X       2-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT. ****
C****                                                           ****
C****  Y       2-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT. ****
C****                                                           ****
C****  IC      THE CURVE NUMBER.                                ****
C****                                                           ****
C*****************************************************************
C*****************************************************************
      SUBROUTINE APOINT (IC)
C
C  DECLARATIONS.
C
```

```
      INTEGER I, N, NN, J, II, IDIC
      REAL R
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPICT(100), Z(18,100), JCOLOR(25)
      JD = INGRAY(2,IC)
      IF (JD .LT. 100) GO TO 10
         CALL ERROR5
      GO TO 60
10    WRITE (6,610)
      DO 20 I = 1, JD
         WRITE (6,620) I, X(IC,I), Y(IC,I)
20    CONTINUE
C
C  DETERMINES IF USER STILL WISHES TO ADD A POINT.
C
30       WRITE (6,630)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
         CALL YORN(IDIC)
      CALL FRTCMS ('CIRSCRN ')
         GO TO (40,80,30),IDIC
40    WRITE (6,640)
         CALL REEDIN(N,*45)
            IF (N .GT. 0 .AND. N .LE. JD ) GO TO 50
            CALL ERROR4(1,JD)
               GO TO 40
45          CALL ERROR8
               GO TO 40
50    II = 99 - N
      INGRAY(2,IC) = INGRAY(2,IC) + 1
      DO 60 J = 1, II
         X(IC,101-J) = X(IC,100-J)
         Y(IC,101-J) = Y(IC,100-J)
60       CONTINUE
70    WRITE(6,650)
      READ(5,*,END=75) X(IC,N+1), Y(IC,N+1)
               GO TO 80
75             REWIND 5
               CALL ERROR8
               GO TO 70
80    RETURN
C
C    FORMAT STATEMENTS.
C
610   FORMAT(//10X,'THIS IS A CURRENT LISTING OF YOUR DATA POINTS.'
     &/10X,'NUMBER',10X,'X VALUE',10X,'Y VALUE'/)
620   FORMAT (/12X, I3,2(5X,1PE12.5))
```

```
 630   FORMAT (//10X,'DO YOU STILL WISH TO ADD A POINT? (Y OR N)')
 640   FORMAT (// 5X,'INPUT THE NUMBER OF THE POINT AFTER WHICH THE NEW P
     &OINT WILL BE ADDED:')
 650   FORMAT (//10X,'WHAT IS THE NEW DATA POINT? (X,Y)')
       END
C*************************************************************************
C*************************************************************************
C****THREED                                                            ****
C****                                                                  ****
C****        SUBROUTINE TO CONTROL CONSTRUCTION OF 3-D GRAPHS.         ****
C****                                                                  ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE THREED
C
C  DECLARATIONS.
C
      INTEGER I, IDIC
      REAL RR
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100), LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  SUBROUTINE EX2D DETERMINES WHICH GRAPHICS DEVICE IS BEING USED.
C
      CALL FRTCMS ('CIRSCRN ')
      CALL EX2D
      CALL FRTCMS ('CIRSCRN ')
C
C  DECISION TO INPUT A NEW GRAPH OR EDIT AN OLD ONE.
C
 10   WRITE(6,610)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
        CALL YORN(IDIC)
        GO TO (30,20,10),IDIC
C
C  SUBROUTINE THREED INPUTS DATA FOR A NEW GRAPH.
C
 20   CALL TH3D
      GO TO 80
C
C  DETERMINES FILE NAME OF GRAPH USER WISHES TO EDIT.
C
 30   WRITE(6,620)
      READ(5,520,END=35) (FILPLT(I),I=1,2)
      CALL FRTCMS('EXEC    ','CHECK   ',FILPLT,NN)
      READ(5,*) NN
```

```
      IF (NN .EQ. 0) GO TO 50
      CALL FRTCMS('CIRSCRN ')
31    WRITE(6,650)
      CALL REEDIN(NN,&33)
      IF (NN .GT. 0 .AND. NN .LT. 3) GO TO 34
33    CALL ERROR4(1,2)
      GO TO 31
34    GO TO (30, 20), NN
      CALL FRTCMS('FILEDEF ','3       ','DISK    ',FILPIT  ,'DATA    ')
      CALL FRTCMS ('CIRSCRN ')
      GO TO 50
35    CALL ERROR8
      GO TO 30
C
C  SUBROUTINE REED INPUTS GRAPH DATA FROM USER'S FILE.
C
50    CALL REED
C
C  SUBROUTINE PLOT3D PLOTS USER'S GRAPH.
C
      NN = IFRAY(5)
      GO TO (60,60,60,60,70), NN
60    CALL PLOT2D
      GO TO 80
70    CALL PLOT3D
      GO TO 80
C
C  DECISION FOR USER TO CONTINUE EDITING GRAPH.
C
80    WRITE (6,630)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
      CALL YORN(IDIC)
      GO TO (90,100,80), IDIC
C
C  SUBROUTINE REV3D EDITS USER'S GRAPH.
C
90    CALL REV3D
100   CONTINUE
C
C  SUBROUTINE FILE FILES GRAPH DATA UNDER USER'S DEFINED FILE NAME
C  FOR FURTHER USE.
C
      CALL FRTCMS ('CIRSCRN ')
      CALL FILE
C
C  DECISION FOR USER TO CONTINUE WORKING ON A NEW GRAPH.
C
```

```
 110  WRITE (6,640)
      CALL ZERO
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
         CALL YORN(IDIC)
         GO TO (10,120,110),IDIC
 120  CONTINUE
C
C  SUBROUTINE DONEPL TERMINATES PLOTTING SEQUENCE.
C
      CALL DONEPL
      RETURN
C
C  FORMAT STATEMENTS.
C
 520     FORMAT (2A4)
 610    FORMAT(/10X,'IS THIS AN UPDATE OF AN OLD GRAPH? (Y OR N)')
 620     FORMAT(//10X,'WHAT IS THE FILE NAME OF YOUR GRAPH?')
 630     FORMAT(//10X,'DO YOU WISH TO UPDATE THIS GRAPH? (Y OR N)')
 640     FORMAT(//10X,'DO YOU WISH TO DEVELOP ANOTHER 3-D GRAPH? (Y OR N
     &)')
 650     FORMAT(//10X,'"FILE NAME WAS NOT FOUND " PLEASE ENTER ONE OF TH
     &E FOLLWING'//10X,'1. REENTER THE FILE NAME'
     & /10X,'2. CONTINUE BY ENTERING A NEW GRAPH')
      END
C*****************************************************************
C*****************************************************************
C****TH3D                                                      ****
C****                                                          ****
C****     SUBROUTINE TO CONTROL CONSTRUCTION OF 3-D NEW GRAPHS.  ****
C****                                                          ****
C*****************************************************************
C*****************************************************************
      SUBROUTINE TH3D
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE EXAMPL DISPLAYS AN EXAMPLE TO GUIDE USER.
C
      CALL EXAM3D
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE PAGE2D DETERMINES DESIRED PAGE SIZE FOR GRAPH.
C
      CALL PAGE2D
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE SUBPLT DETERMINES DIMENSIONS OF SUBPLOT AREA.
C
```

```
      CALL SUBPLT
         CALL FRTCMS ('CLRSCRN ')
C
CC  SUBROUTINE HEADNG INPUTS TITLE OF USER'S GRAPH.
C
      CALL HEADNG
         CALL FRTCMS ('CLRSCRN ')
C
CC  SUBROUTINE XAXIS INPUTS TITLE OF X-AXIS.
C
      CALL XAXIS
         CALL FRTCMS ('CLRSCRN ')
C
CC  SUBROUTINE YAXIS INPUTS TITLE OF Y-AXIS.
C
      CALL YAXIS
         CALL FRTCMS ('CLRSCRN ')
C
CC  SUBROUTINE ZAXIS INPUTS TITLE OF Z-AXIS.
C
      CALL ZAXIS
         CALL FRTCMS ('CLRSCRN ')
C
CC  SUBROUTINE MESS INPUTS A MESSAGE FOR THE USER.
C
      CALL MESS (1)
         CALL FRTCMS ('CLRSCRN ')
C
CC  SUBROUTINE LOCLEG DETERMINES LEGEND LOCATION.
C
      CALL LOCLEG
         CALL FRTCMS ('CLRSCRN ')
C
CC  SUBROUTINE XVALUE INPUTS ORIGIN VALUE, STEP, AND MAX VALUE OF X-AXIS.
C
      CALL XVALUE
         CALL FRTCMS ('CLRSCRN ')
C
CC  SUBROUTINE YVALUE INPUTS ORIGIN VALUE, STEP, AND MAX VALUE OF Y-AXIS.
C
      CALL YVALUE
         CALL FRTCMS ('CLRSCRN ')
C
CC  SUBROUTINE ZVALUE INPUTS ORIGIN VALUE, STEP, AND MAX VALUE OF Z-AXIS.
C
      CALL ZVALUE
         CALL FRTCMS ('CLRSCRN ')
C
C   SUBROUTINE GRID3D INPUTS THE GRID DATA.
```

```
C
      CALL GRID3D
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE CRVS INPUTS THE DATA FOR USER'S CURVES.
C
      CALL CRVS3D
         CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE PLOT3D PLOTS USER'S GRAPH.
C
      CALL PLOT3D
      RETURN
      END
C*************************************************************************
C*************************************************************************
C**** CRVS3D                                                          ****
C****              SUBROUTINE TO DEVELOP A CURVE.                     ****
C****                                                                 ****
C****                VARIABLES AND CONSTANTS                          ****
C****                                                                 ****
C****  RR            DUMMY REAL VALUE FOR DEVICE TYPE.                ****
C****                                                                 ****
C****  INGRAY(2,I)   NUMBER OF POINTS ON THE CURVE.                   ****
C****                                                                 ****
C****  KKK           NUMBER OF POINTS ON THE CURVE.                   ****
C****                                                                 ****
C****  INGRAY(1,4)   NUMBER OF CURVES FOR THIS GRAPH.                 ****
C****                                                                 ****
C****  KK            NUMBER OF CURVES FOR THIS GRAPH.                 ****
C****                                                                 ****
C****  INGRAY(3,I)   NUMBER OF POINTS TO BE PLOTTED FOR THIS GRAPH.   ****
C****                                                                 ****
C****  LETTER(10,I)  TITLE OF EACH CURVE FOR THIS GRAPH.              ****
C****                                                                 ****
C****  J             WHICH OF THE CURVES IS BEING OPERATED ON.        ****
C****                                                                 ****
C****  JJ            NUMBER OF LETTERS IN THE CURVE TITLE.            ****
C****                                                                 ****
C****  X(I,JJ)       X-COORDINATE OF A DATA POINT.                    ****
C****                                                                 ****
C****  Y(I,JJ)       Y-COORDINATE OF A DATA POINT.                    ****
C****                                                                 ****
C****  Z(I,JJ)       Z-COORDINATE OF A DATA POINT.                    ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
      SUBROUTINE CRVS3D
C
```

```
C  DECLARATIONS.
C
      REAL RR
      INTEGER J,I,JJ,K,KK,KKK,L, LP
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     C ,X(18,100), Y(18,100), LINE(72), XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C  DETERMINES HOW MANY CURVES ARE TO BE PLOTTED.
C
 10   WRITE (6,600)
      CALL REEDIN(NN,&15)
         INGRAY(1,4) = NN
         IF (NN .LT. 1 ) GO TO 220
         IF (NN .LT.19) GO TO 20
 15            CALL ERROR7
               GO TO 10
 20       KK = INGRAY(1,4)
C
C  DETERMINES THE TITLE OF EACH CURVE.
C
      DO 210 I=1, KK
 30      CALL FRTCMS ('CLRSCRN ')
 40      WRITE (6,610) I
         J = 5 +I
         READ (5,510,END=45) (IETRAY(K,J),K=1,9)
               CALL LETTER(J,JJ)
               IF (JJ.IT.10) GO TO 60
               CALL ERROR3
               GO TO 40
 45            CALL ERROR8
               GO TO 40
C
C  DETERMINES THE LINE PATTERN TO BE USED.
C
 60   CALL PATNER(LP)
        INGRAY(6,I) = LP
        CALL FRTCMS ('CLRSCRN ')
C
C  DETERMINES WHICH METHOD THE USER WISHES TO USE TO INPUT CURVE DATA.
C
 70       WRITE (6,620)
          CALL REEDIN(NN,&75)
          IF (NN.GT. 0 .AND. NN.LT. 3) GO TO 90
 75          CALL ERROR4 (1,2)
             GO TO 70
 90          CALL FRTCMS('CLRSCRN ')
             GO TO (100,200),NN
C
```

```
C  USER DESIGNATES NUMBER OF DATA POINTS HE WISHES TO ENTER.
C
 100      WRITE (6,630)
          CALL REEDIN(NN,&105)
               IF (NN.LT. 101) GO TO 120
               CALL ERROR5
                    GO TO 100
 105          CALL ERROR8
                    GO TO 100
 120          INGRAY(2,I) = NN
                 KKK= NN
C
C  USER DESIGNATES NUMBER OF DATA POINTS HE WISHES MARKED.
C
      CALL FRTCMS ('CLRSCRN ')
 130  WRITE (6,636)
          CALL REEDIN(NN,&135)
          INGRAY(3,I) = NN
          IF (IABS(INGRAY(3,I)).LE. KKK) GO TO 150
 135         CALL ERROR4 (-KKK,KKK)
             GO TO 130
C
C  USER INPUTS THE DATA PAIRS.
C
 150           DO 190 JJ=1, KKK
 160      CALL FRTCMS ('CLRSCRN ')
 170           WRITE (6,640) JJ,KKK
               READ (5,*,END=180) X(I,JJ), Y(I,JJ), Z(I,JJ)
               GO TO 190
 180           CALL ERROR8
               GO TO 170
 190           CONTINUE
C
C  SUBROUTINE DATCHK CHECKS CORRECTNESS OF INPUTTED DATA.
C
              CALL DTCH3D(I,KKK)
                 GO TO 210
C
C  SUBROUTINE USEFIL INPUTS DATA FROM A USER-DEFINED FILE.
C
 200  IKK = I
              CALL USRF3I (IKK)
                 IF(IKK .EQ. -1) GO TO 30
C
C  SUBROUTINE DATCHK CHECKS CORRECTNESS OF INPUTTED DATA.
C
              CALL DTCH3D(I,KKK)
 210      CONTINUE
 220      CONTINUE
```

```
      RETURN
C
C  FORMAT STATEMENTS.
C
  510   FORMAT (9A4)
  600   FORMAT(//10X,'HOW MANY CURVES DO YOU WISH TO PLOT? (0 THRU 18)')
  610   FORMAT(//10X,'WHAT IS THE NAME OF CURVE',I2,' ?'/15X,
     &       '(32 CHARACTERS MAX)')
  620   FORMAT (///10X,'WHICH METHOD DO YOU WISH TO USE TO INPUT DATA FOR
     & THIS CURVE?'/
     &16X,'1. TYPE IN DATA ONE POINT AT A TIME.'
     &/16X,'2. USE DATA FILE INPUT.')
  630   FORMAT(//10X,'HOW MANY POINTS DO YOU WISH TO PLOT ON THIS CURVE?
     &(100 MAX)')
  636     FORMAT(//30X,'MARKER SYMBOL INFORMATION'/
     &/8X,'A POSITIVE NUMBER--POINTS WILL BE CONNECTED AND MARKER SYMBOL
     &S DESIGNATED'
     &/14X,'(*--------*--------*--------*--------*)'
     &/ 8X,'ZERO (0)--POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.'
     &/14X,'(-------------------------------------)'
     &/8X,'A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBO
     &LS ONLY.'
     &/14X,'(*        *        *        *        *)'
     &//10X,'EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND
     &CONNECTED'/24X,'BY A LINE)'
     &// 5X,'HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DI
     &SPLAYED?')
  640   FORMAT(//10X,'X-COORDINATE, Y-COORDINATE, AND Z-COORDINATE IN YOU
     &R UNITS,'/13X,
     &'POINT ',I3,' OF ',I3,' POINTS.')
      END
C*************************************************************************
C*************************************************************************
C****  PLOT3D                                                          ****
C****                    SUBROUTINE FOR A GRAPH                        ****
C****                      IN TWO-DIMENSIONAL                          ****
C****                        COORDINATES.                              ****
C****                                                                  ****
C****                  VARIABLES AND CONSTANTS                         ****
C****                                                                  ****
C****     RELRAY(1,1)     VALUE OF HORIZONTAL PAGE LENGTH.             ****
C****                                                                  ****
C****     RELRAY(1,2)     VALUE OF VERTICAL PAGE LENGTH.               ****
C****                                                                  ****
C****     RELRAY(1,3)     VALUE OF HORIZONTAL SUBPLOT LENGTH.          ****
C****                                                                  ****
C****     RELRAY(1,4)     VALUE OF VERTICAL SUBPLOT LENGTH.            ****
C****                                                                  ****
C****     RELRAY(1,5)     LOCATION IN INCHES HORIZONTAL OF THE LOWER   ****
```

```
C****                    LEFTHAND CORNER OF LEGEND.                    ****
C****                                                                  ****
C****    RELRAY(1,6)     LOCATION IN INCHES VERTICAL OF THE LOWER      ****
C****                    LEFTHAND CORNER OF LEGEND.                    ****
C****                                                                  ****
C****    RELRAY(2,1)     VALUE OF X AT ORIGIN.                         ****
C****                                                                  ****
C****    RELRAY(2,2)     VALUE OF X STEP INTERVAL.                     ****
C****                                                                  ****
C****    RELRAY(2,3)     MAXIMUM VALUE OF X.                           ****
C****                                                                  ****
C****    RELRAY(2,4)     VALUE OF Y AT ORIGIN.                         ****
C****                                                                  ****
C****    RELRAY(2,5)     VALUE OF Y STEP INTERVAL.                     ****
C****                                                                  ****
C****    RELRAY(2,6)     MAXIMUM VALUE OF Y.                           ****
C****                                                                  ****
C****    RELRAY(3,1)     VALUE OF Z AT ORIGIN.                         ****
C****                                                                  ****
C****    RELRAY(3,2)     VALUE OF Z STEP INTERVAL.                     ****
C****                                                                  ****
C****    RELRAY(3,3)     MAXIMUM VALUE OF Z.                           ****
C****                                                                  ****
C****    RELRAY(4,5)     X-VALUE OF HORIZONTAL LOCATION OF MESSAGE.    ****
C****                                                                  ****
C****    RELRAY(4,6)     Y-VALUE OF VERTICAL LOCATION OF MESSAGE.      ****
C****                                                                  ****
C****    LETRAY(10,2)    TITLE OF GRAPH.                               ****
C****                                                                  ****
C****    LETRAY(10,3)    TITLE OF X-AXIS.                              ****
C****                                                                  ****
C****    LETRAY(10,4)    TITLE OF Y-AXIS.                              ****
C****                                                                  ****
C****    LETRAY(10,1)    TITLE OF Z-AXIS.                              ****
C****                                                                  ****
C****    LETRAY(10,11)   THE MESSAGE USER DESIRES.                     ****
C****                                                                  ****
C****    INGRAY(1,4)     NUMBER OF CURVES IN THIS GRAPH.               ****
C****                                                                  ****
C****    INGRAY(1,5)     NUMBER OF GRID LINES PER X-AXIS X,Y PLANE.    ****
C****                                                                  ****
C****    INGRAY(1,6)     NUMBER OF GRID LINES PER Y-AXIS X,Y PLANE.    ****
C****                                                                  ****
C****    INGRAY(5,2)     NUMBER OF GRID LINES PER X-AXIS X,Z PLANE.    ****
C****                                                                  ****
C****    INGRAY(5,3)     NUMBER OF GRID LINES PER Z-AXIS X,Z PLANE.    ****
C****                                                                  ****
C****    INGRAY(5,4)     NUMBER OF GRID LINES PER Y-AXIS Y,Z PLANE.    ****
C****                                                                  ****
```

```
C****    INGRAY(5,5)     NUMBER OF GRID LINES PER Z-AXIS X,Z PLANE.   ****
C****                                                                 ****
C****    INGRAY(2,I)     NUMBER OF DATA POINTS TO BE PLOTTED.         ****
C****                                                                 ****
C****    INGRAY(3,I)     NUMBER OF DATA POINTS TO BE MARKED.          ****
C****                                                                 ****
C****    INGRAY(5,6)     LINE PATTERN USED TO DRAW GRID LINES.        ****
C****                                                                 ****
C****    INGRAY(6,I)     LINE PATTERN USED TO DRAW CURVES.            ****
C****                                                                 ****
C****    IFRAY(1)        WHETHER OR NOT GRAPH HAS A LEGEND.           ****
C****                                                                 ****
C****    IFRAY(3)        WHETHER OR NOT GRAPH HAS A MESSAGE.          ****
C****                                                                 ****
C****    IFRAY(4)        WHETHER OR NOT GRAPH HAS GRID LINES.         ****
C****                                                                 ****
C****    IFRAY(6)        THE TYPE OF NUMBERING TO BE USED ON X-AXIS.  ****
C****                                                                 ****
C****    IFRAY(7)        THE TYPE OF NUMBERING TO BE USED ON Y-AXIS.  ****
C****                                                                 ****
C****    IFRAY(8)        THE TYPE OF NUMBERING TO BE USED ON Z-AXIS.  ****
C****                                                                 ****
C****    IFRAY(11)       WHETHER OR NOT USER WANTS COLOR.             ****
C****                                                                 ****
C****    XPLOT           X-COORDINATE OF A DATA POINT.                ****
C****                                                                 ****
C****    YPLOT           Y-COORDINATE OF A DATA POINT.                ****
C****                                                                 ****
C****    ZPLOT           Y-COORDINATE OF A DATA POINT.                ****
C****                                                                 ****
C****    IDIC            USED TO STORE YES OR NO ANSWERS.             ****
C****                                                                 ****
C****    LINE            DUMMY ARRAY FOR CHARACTER STRINGS.           ****
C****                                                                 ****
C****    K               INDEX.                                       ****
C****                                                                 ****
C****    JJ              NUMBER OF CHARACTERS IN CHARACTER STRING.    ****
C****                                                                 ****
C****    RR              DUMMY REAL VALUE.                            ****
C****                                                                 ****
C*********************************************************************
C*********************************************************************
      SUBROUTINE PLOT3D
C
C  DECLARATIONS.
C
      INTEGER FF1, FF2, FF3, FF4, FF5, FF6, FF9, K, I,[illegible]
     & ,FF7,FF8
      COMMON RELRAY(6,18), INGRAY(7,13), LETRAY(10,[illegible]), [illegible](11)
```

```
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
C
C   FORTRAN REQUIREMENT TO USE A COMPUTED GO TO STATEMENT.
C
          FF1 = IFRAY(1)
          FF3 = IFRAY(3)
          FF4 = IFRAY(4)
          FF6 = INGRAY(1,4)
          FF7 = IFRAY(7)
          FF8 = IFRAY(8)
          FF5 = IFRAY(6)
          FF9 = IFRAY(11)
       GO TO ( 5,45),FF9
  5    CALL SPCMOD
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN TO BE USED TO DRAW BORDER.
C
          WRITE (6,610)
          ICCLOR = 0
          CALL COLOR(ICOLOR)
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
       DO 10 I=1,FF6
          WRITE(6,620) I
          ICCLOR = 0
          CALL COLOR(ICOLOR)
          JCCLOR(I)=ICCLOR
  10   CONTINUE
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES
C   FOR PLANE A.
C
          WRITE (6,630)
          ICCLOR = 0
          CALL COLOR(ICOLOR)
          JCCLOR(20)=ICOLOR
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES
C   FOR PLANE B.
C
          WRITE (6,640)
          ICCLOR = 0
          CALL COLOR(ICOLOR)
          JCOLOR(21)=ICOLOR
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES
C   FOR PLANE C.
```

```
C
          WRITE (6,650)
          ICOLOR = 0
          CALL COLOR(ICOLOR)
          JCOLOR(22) = ICOLOR
          ICOLOR=JCOLOR(19)
          CALL COLOR(ICOLOR)
   45     CONTINUE
C
C  SUBROUTINE ERRSET REMOVES ERROR MESSAGE FROM DISSPLA .ERR.
C
       CALL RESET ('ALL')
       CALL ERRSET (208, 256, -1, 1)
C
C  SUBROUTINE HWSCAL DOES THE SCALING OF THE GRAPH ON THE DEVICE.
C
   50  CALL HWSCAL ('SCREEN')
C50    CALL HWSCAL ('NONE')
       CALL UCCHAR
C
C  SUBROUTINE PAGE DEFINES THE PAGE SIZE.
C
       CALL PAGE (RELRAY(1,1),RELRAY(1,2))
C
C  SUBROUTINE HWROT ROTATES THE PAGE TO FIT THE SCREEN.
C
       CALL HWROT ('AUTO')
C
C  SUBROUTINE AREA2D DEFINES THE SUBPLOT AREA.
C
   60  CALL AREA2D (RELRAY(1,3),RELRAY(1,4))
C
C  SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAY TO ONE.
C
       GO TO (70,80), FF3
   70  CALL CHANGE (5)
C
C  SUBROUTINE MESSAG INPUTS THE USER'S MESSAGE.
C
       CALL MESSAG (LINE, 100, RELRAY(4,5),RELRAY(4,6))
   80  CONTINUE
C
C  SUBROUTINE LETTAR DETERMINES THE TYPE OF LETTERING.
C
       CALL LETTAR
C
C  SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAY TO ONE.
```

```
C
      CALL CHANGE (3)
C
C  SUBROUTINE XINTAX INPUTS INTEGER NUMBERING ON X-AXIS.
C
      GO TO (82,81),FF5
 81   CALL XINTAX
C
C  SUBROUTINE X3NAME INPUTS THE TITLE OF THE X-AXIS.
C
 82   CALL X3NAME (LINE, 100)
C
C  SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAY TO ONE.
C
      CALL CHANGE (4)
C
C  SUBROUTINE YINTAX INPUTS INTEGER NUMBERING ON Y-AXIS.
C
      GO TO (84,83),FF7
 83   CALL YINTAX
C
C  SUBROUTINE Y3NAME INPUTS THE TITLE OF THE Y-AXIS.
C
 84   CALL Y3NAME (LINE, 100)
C
C  SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAY TO ONE.
C
      CALL CHANGE (1)
C
C  SUBROUTINE ZINTAX INPUTS INTEGER NUMBERING ON Z-AXIS.
C
      GO TO (86,85),FF8
 85   CALL ZINTAX
C
C  SUBROUTINE Z3NAME INPUTS THE TITLE OF THE Z-AXIS.
C
 86   CALL Z3NAME (LINE, 100)
C
C  SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAY TO ONE.
C
      CALL CHANGE (2)
C
C  SUBROUTINE HEADIN INPUTS THE TITLE OF THE GRAPH.
C
      CALL HEADIN ('                    ', 100, 1.5, 2)
```

```
      CALL READIN (LINE, 100, 1.5, 2 )
C
C
C  SUBROUTINE GRAF DEFINES THE PARAMETERS OF THE GRAPH.
C
      IF(RELRAY(1,3).GE.RELRAY(1,4)) GO TO 140
         R = RELRAY(1,3)-.5
         GO TO 150
  140    R = RELRAY(1,4)-.5
  150 CONTINUE
      CALL VOLM3D (R,R,R)
      CALL VUABS (-1.5*R,-1.5*R,1.5*R)
      CALL GRAF3D (RELRAY(2,3), RELRAY(2,2), RELRAY(2,1), RELRAY(2,6),
     &RELRAY(2,5), RELRAY(2,4),RELRAY(3,1), RELRAY(3,2),RELRAY(3,3))
C
C  EXECUTES USER'S DECISION ON NUMBER OF CURVES TO BE PLOTTED.
C
      IF (FF6 .EQ. 0) GO TO 200
  160 DO 200 I = 1, FF6
C
C  TYPE OF CURVE FITTING EMPLOYED ON CURVES.
C
      CALL FIT(I)
C
C  SUBROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
      GO TO (170,180),FF9
  170    CALL MYSPEC(I)
  180 CONTINUE
C
C  ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
C
         LP = INGRAY(6,I)
         CALL PAT(LP)
         CALL RESET ('LEGLIN')
         GO TO (190,195), FF1
  190    IF (INGRAY(3,I).LT. 0) GO TO 200
         CALL LEGLIN
C
C  SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAYS TO ONE.
C
  195    CALL SWITCH (I,INGRAY(2,I))
C
C  SUBROUTINE CURVE DEFINES ALL THE PARAMETERS FOR EACH CURVE.
C
         CALL CURV3D (XPLOT, YPLOT,ZPLOT, INGRAY(2,I), INGRAY( ,I))
  200 CONTINUE
C
```

```
C  THE INFORMATION THAT DEFINES PLANE B.
C
C  SUBROUTINE GRFITI DEFINES THE PARAMETERS OF PLANE B.
C
      CALL GRFITI (R,B,0.0,B,0.0,0.0,R,0.0,1.0)
      CALL AREA2D (R,B)
      CALL GRAF (RELRAY(2,4), RELRAY(2,5), RELRAY(2,6),RELRAY(3,1),
     &RELRAY(3,2), RELRAY(3,3))
C
C  EXECUTES USER'S DECISION ON NUMBER OF CURVES TO BE PLOTTED.
C
      IF (FF6 .EQ. 0) GO TO 445
400   DO 445 I = 1, FF6
C
C  TYPE OF CURVE FITTING EMPLOYED ON CURVES.
C
      CALL FIT(I)
C
C  SUBROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
      GO TO (410,420),FF9
410      CALL MYSPEC(I)
420   CONTINUE
C
C  ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
C
         LP = INGRAY(6,I)
         CALL PAT(LP)
C
C  SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAYS TO ONE.
C
440      CALL SWITCH (I,INGRAY(2,I))
C
C  SUBROUTINE CURVE DEFINES ALL THE PARAMETERS FOR EACH CURVE.
C
         CALL CURVE (XPLOT, YPLOT, INGRAY(2,I),INGRAY(3,I))
445   CONTINUE
C
C  EXECUTES USER'S DECISION REGARDING GRID LINES.
C
      GO TO (450,480),FF4
C
C  SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES.
C
450   GO TO (460,470),FF9
460      ICOLOR=JCOLOR(2)
         CALL COLOR(ICOLOR)
470   CONTINUE
```

```
C
C  SUBROUTINE GRID DEFINES THE PARAMETERS FOR GRID LINES.
C
          LP = INGRAY(7,2)
          CALL PAT(LP)
          CALL GRID (INGRAY(5,4),INGRAY(5,5))
 480  CONTINUE
C
C  THE INFORMATION THAT DEFINES PLANE C.
C
C
C  SUBROUTINE GRFITI DEFINES THE PARAMETERS OF PLANE C.
C
      CALL GRFITI (0.0,0.0,0.0,R,0.0,0.0,0.0,R,0.0)
      CALL AREA2D (R,R)
 500  CALL GRAF (RELRAY(2,3), RELRAY(2,2), RELRAY(2,1),RELRAY(2,6),
     &RELRAY(2,5), RELRAY(2,4))
C
C  EXECUTES USER'S DECISION ON NUMBER OF CURVES TO BE PLOTTED.
C
      IF (FF6 .EQ. 0) GO TO 550
 510  DO 550 I = 1, FF6
C
C  TYPE OF CURVE FITTING EMPLOYED ON CURVES.
C
      CALL FIT(I)
C
C  SUBROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
      GO TO (520,530), FF9
 520      CALL MYSPEC(I)
 530  CONTINUE
C
C  ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
C
          LP = INGRAY(6,I)
          CALL PAT(LP)
C
C  SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C  ARRAYS TO ONE.
C
 545      CALL SWITCH (I,INGRAY(2,1))
C
C  SUBROUTINE CURVE DEFINES ALL THE PARAMETERS FOR EACH CURVE.
C
          CALL CURVE (XPLOT, YPLOT, INGRAY(2,1),INGRAY(5,1))
 550  CONTINUE
C
C  EXECUTES USER'S DECISION REGARDING GRID LINES.
```

```
C
      GO TO (560,590),FF4
C
C  SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES.
C
 560  GO TO (570,580),FF9
 570      ICOLOR=JCOLOR(22)
          CALL COLOR(ICOLOR)
 580  CONTINUE
C
C  SUBROUTINE GRID DEFINES THE PARAMETERS FOR GRID LINES.
C
          LP = INGRAY(5,6)
          CALL PAT(LP)
          CALL GRID (INGRAY(1,5),INGRAY(1,6))
 590  CONTINUE
C
C  THE INFORMATION THAT DEFINES PLANE A.
C
C  SUBROUTINE GRFITI DEFINES THE PARAMETERS OF PLANE A.
C
      CALL GRFITI (0.0,R,0.0,1.0,R,0.0,R,R,1.0)
      CALL AREA2D (R,R)
      CALL GRAF (RELRAY(2,3), RELRAY(2,2), RELRAY(2,1),RELRAY(3,1),
     &RELRAY(3,2), RELRAY(3,3))
C
C  EXECUTES USER'S DECISION ON NUMBER OF CURVES TO BE PLOTTED.
C
      IF (FF6 .EQ. 0) GO TO 270
 220  DO 270 I = 1, FF6
C
C  TYPE OF CURVE FITTING EMPLOYED ON CURVES.
C
      CALL FIT(I)
C
C  SUBROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
      GO TO (230,240),FF9
 230      CALL MYSPEC(1)
 240  CONTINUE
C
C  ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
C
          LP = INGRAY(6,I)
          CALL PAT(LP)
          CALL RESET ('LEGLIN')
          GO TO (250,260), FF1
 250      IF (INGRAY(3,I).LT. 0) GO TO 79
          CALL LEGLIN
```

```
C
C   SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C   ARRAYS TO ONE.
C
 260      CALL SWITCH (I,INGRAY(2,1))
C
C   SUBROUTINE CURVE DEFINES ALL THE PARAMETERS FOR EACH CURVE.
C
          CALL CURVE (XPLOT, ZPLOT, INGRAY(2,1),INGRAY(3,1))
             IDIM = 5 + I
C
C   SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C   ARRAY TO ONE.
C
          CALL CHANGE (IDIM)
C
C   SUBROUTINE LINES INPUTS THE TITLE OF EACH CURVE INTO THE LEGEND.
C
          CALL LINES (LINE,IPAK,I)
 270   CONTINUE
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN TO BE USED.
C
       GO TO (275,276),FF9
 275      ICOLOR = JCOLOR(19)
          CALL COLOR(ICOLOR)
 276   CONTINUE
C
C   EXECUTES THE USER'S DECISION REGARDING A LEGEND.
C
       GO TO (280,290), FF1
C
C   SUBROUTINE LEGEND INPUTS THE PARAMETER FOR THE LEGEND AND PUTS A
C   BOX AROUND THE LEGEND.
C
 280   CALL LEGEND (IPAK,INGRAY(1,4), RELRAY(1,5)+.2, RELRAY(1,6)+.2)
C
C   SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE LEGEND.
C
       GO TO (285,286),FF9
 285      ICOLOR = JCOLOR(19)
          CALL COLOR(ICOLOR)
 286   CONTINUE
          X1 = XLEGND (IPAK, INGRAY(1,4))
          Y1 = YLEGND (IPAK, INGRAY(1,4))
          CALL BLREC (RELRAY(1,5),RELRAY(1,6), X1+.4, Y1+.1,-2.0)
 290   CONTINUE
C
C   EXECUTES USER'S DECISION REGARDING GRID LINES.
```

```
C
      GO TO (295,320),FF4
C
C  SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES
C  FOR PLANE A
C
 295  GO TO (300,310),FF9
 300     ICOLOR=JCOLOR(20)
         CALL COLOR(ICOLOR)
 310  CONTINUE
C
C  SUBROUTINE GRID DEFINES THE PARAMETERS FOR GRID LINES.
C
         LP = INGRAY(7,1)
         CALL PAT(LP)
         CALL GRID (INGRAY(5,2),INGRAY(5,3))
 320     CONTINUE
      CALL RESET ('ALL')
      CALL ENDPL (0)
      RETURN
C
C  FORMAT STATEMENTS.
C
 610  FORMAT(/18X,'TO DRAW BORDER OF GRAPH')
 620  FORMAT(/17X,'TO DRAW CURVE',I3)
 630  FORMAT(/15X,'TO DRAW GRID FOR PLANE A')
 640  FORMAT(/15X,'TO DRAW GRID FOR PLANE B')
 650  FORMAT(/15X,'TO DRAW GRID FOR PLANE C')
      END
C*****************************************************************
C*****************************************************************
C**** USRF31                                                   ****
C****       SUBROUTINE TO GET FILE FOR USER TO PLOT A CURVE.   ****
C****                                                          ****
C****              VARIABLES AND CONSTANTS                     ****
C****                                                          ****
C****  X            TWO-DIMENSIONAL ARRAY FOR X-COORDINATE OF  ****
C****               A DATA POINT.                              ****
C****                                                          ****
C****  Y            TWO-DIMENSIONAL ARRAY FOR Y-COORDINATE OF  ****
C****               A DATA POINT.                              ****
C****                                                          ****
C****  Z            TWO-DIMENSIONAL ARRAY FOR Z-COORDINATE OF  ****
C****               A DATA POINT.                              ****
C****                                                          ****
C****  KKK          THE CURVE NUMBER.                          ****
C****                                                          ****
C****  INGRAY(2,KK) NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE. ****
C****                                                          ****
```

```
C****  INGRAY(3,KK) NUMBER OF POINTS TO BE MARKED FOR THE CURVE.    ****
C****                                                                 ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE USRF3L (KK)
C
C  DECLARATIONS.
C
      INTEGER I,K,KK,J
      REAL XYZ(10,100)
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), [illegible]RAY(11)
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
      CALL FRTCMS ('CIRSCRN ')
C
C  GIVES USER INSTRUCTIONS ON HOW TO INPUT HIS FILE.
C
      WRITE (6,600)
C
C  INPUTS THE USER-DEFINED NAME OF DATA FILE.
C
10     WRITE (6,610)
      READ(5,510,END=15) (FILPLT(I),I=1,2)
      CALL FRTCMS('EXEC    ','CHECK   ',FILPLT  ,NN)
      READ(5,*) NN
      CALL FRTCMS ('CIRSCRN ')
         IF (NN .EQ. 0) GO TO 20
 11      WRITE(6,660)
         CALL REEDIN(NN,&12)
         IF (NN .GT. 0 .AND. NN .LT. 3) GO TO 13
 12      CALL ERROR4 (1,3)
         GO TO 11
 13      GO TO (10,150,160),NN
 15   CALL ERROR8
      GO TO 10
 20   CALL FRTCMS('FILEDEF ','3       ','DISK    ',FILPLT  ,'DATA    ')
      REWIND 3
      CALL FRTCMS ('CIRSCRN ')
 25      WRITE(6,615)
         CALL REEDIN(NN,&28)
         IXF = NN
         IF (NN .GT. 0 .AND. NN .LT.11) GO TO 29
 28      CALL ERROR4 (1,10)
         GO TO 25
C
C  DETERMINES THE METHOD THE USER WOULD LIKE TO USE TO INPUT HIS DATA;
C  A POINT AT A TIME OR BY SENTINEL METHOD.
C
 29   CALL FRTCMS ('CIRSCRN ')
```

```
 30    WRITE(6,620)
       CALL FEEDIN(NN,635)
          IF (NN.GT. 0 .AND. NN.LT. 3) GO TO 40
 35          CALL ERROR4 (1,2)
             GO TO 30
 40        GO TO (50, 60), NN
C
C  DETERMINES HOW MANY POINTS THE USER WISHES TO INPUT FOR THIS CURVE.
C
 50    WRITE(6,630)
       CALL FEEDIN(NN,655)
          I = NN
          INGRAY(2,KK) = I
          IF(I.LT. 101) GO TO 60
          CALL ERROR5
          GO TO 50
 55       CALL ERROR8
          GO TO 50
 60       DO 70 JY=1,I
C
C  READS IN THE DATA FROM A USER DEFINED FILE.
C
                READ(3,*) (XYZ(IX,JY),IX = 1,IXF)
 70       CONTINUE
       GO TO 120
C
C  DETERMINES THE SENTINEL VALUE THE USER WANTS TO USE.
C
 80    WRITE (6,640)
       CALL FEEDRE(R,685)
          GO TO 90
 85    CALL ERROR8
          GO TO 80
 90    J = 1
C
C  READS IN THE DATA FROM A USER DEFINED FILE.
C
 100   READ(3,*) (XYZ(IX,JY),IX = 1,IXF)
       IF (R .EQ. XYZ(1,J)) GO TO 120
       INGRAY(2,KK) = INGRAY(2,KK) + 1
       IF(J.EQ.100) GO TO 110
       J = J + 1
       GO TO 100
 110   CALL ERROR5
C
C  USER DESIGNATES NUMBER OF DATA POINTS HE WISHES TO INPUT.
C
 120   CONTINUE
          CALL FRICMS ('CLESCRE ')
```

```
121   WRITE (6,670)
      CALL REEDIN(NN,&123)
        IX = NN
        IF (NN .GT. 0 .AND. NN .LE. IXF) GO TO 124
123         CALL ERRCB4(1,IXF)
            GO TO 121
124     JYM = INGRAY(2,KK)
        DO 125 JY = 1, JYM
          X(KK,JY) = XYZ(IX,JY)
125     CONTINUE
      CALL FRTCMS ('CIRSCRN ')
126   WRITE (6,680)
      CALL REEDIN(NN,&127)
        IX = NN
        IF (NN .GT. 0 .AND. NN .LE. IXF) GO TO 128
127         CALL ERRCB4(1,IXF)
            GO TO 126
128     JYM = INGRAY(2,KK)
        DO 129 JY = 1, JYM
          Y(KK,JY) = XYZ(IX,JY)
129     CONTINUE
        CALL FRTCMS ('CIRSCRN ')
131   WRITE (6,690)
      CALL REEDIN(NN,&133)
        IX = NN
        IF (NN .GT. 0 .AND. NN .LE. IXF) GO TO 134
133         CALL ERRCB4(1,IXF)
            GO TO 131
134     JYM = INGRAY(2,KK)
        DO 135 JY = 1, JYM
          Z(KK,JY) = XYZ(IX,JY)
135     CONTINUE
      CALL FRTCMS ('CIRSCRN ')
136   WRITE (6,636)
      CALL REEDIN(NN,&137)
      INGRAY(3,KK) = NN
        IF (IABS(INGRAY(3,KK)).LE. INGRAY(2,KK)) GO TO 140
            LL= INGRAY(2,KK)
            CALL ERRCB4(-LL,IL)
            GO TO 136
137         CALL ERRCB8
            GO TO 136
140   RETURN
150   KK = -1
      RETURN
160   CALL EXIT1
      RETURN
C
C  FORMAT STATEMENTS.
```

```
C
  510      FORMAT (2A4)
  520      FORMAT (3E12.5)
  600      FORMAT (//10X,'NOTE: BEFORE THIS PROGRAM CAN BE USED'
     &/10X,'YOUR DATA FILE MUST BE A FIXED FORMAT FILE, 80 CHARACTERS'
     &/10X,'IN LENGTH, WITH A SPACE OR A COMMA BETWEEN THE VALUES.')
  610      FORMAT (/10X,'WHAT IS THE FILENAME FOR THIS FILE? "TYPE DATA"')
  615      FORMAT (/10X,'HOW MANY VALUES PER ROW DO YOU HAVE? (10 MAX)')
  620      FORMAT (/10X,'HOW WOULD YOU LIKE TO INPUT THESE DATA POINTS?'
     &/10X,'1. BY INPUTTING THE NUMBER OF DATA POINTS YOU WISH TO PLOT.
     &'/10X,'   VALUES WILL BE PLOTTED IN ORDER FROM THE FIRST TO THE LA
     &ST.'
     &/10X,'2. BY INPUTTING A LAST VALUE IN THE FIRST COLUMN OF YOUR DAT
     &A FILE.'/10X,'   THIS VALUE WILL NOT BE PLOTTED AND IS CALLED A SE
     &NTINEL.')
  630      FORMAT (//10X,'HOW MANY POINTS DO YOU WISH TO PLOT FROM YOUR FIL
     &E? (100 MAX) ')
  636      FORMAT (//30X,'MARKER SYMBOL INFORMATION'/
     &/8X,'A POSITIVE NUMBER--POINTS WILL BE CONNECTED AND MARKER SYMBOL
     &S DESIGNATED'
     &/14X,'(I.E.(1) =  *--------*--------*--------*--------*)'
     &/ 8X,'ZERO (0) --POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.'
     &/14X,'(I.E.(0) =  ----------------------------------)'
     &/8X,'A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBO
     &LS ONLY.'
     &/14X,'(I.E.(-1) =  *        *        *        *        *)'
     &//10X,'EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND
     &CONNECTED'/24X,'BY A LINE)'
     &// 5X,'HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DI
     &SPLAYED?')
  640      FORMAT (//10X,'WHAT IS THE VALUE OF YOUR SENTINEL?'
     &/10X,'NOTE: YOU MUST STILL PUT THREE VALUES IN SENTINEL DATA LINE'
     &/10X,'FIRST VALUE IS THE SENTINEL.')
  660      FORMAT (//10X,'"FILE NAME WAS NOT FOUND" PLEASE ENTER ONE OF TH
     &E FOLLOWING'//10X,'1. REENTER THE FILE NAME'
     &/10X,'2. CONTINUE BY ENTERING A NEW CURVE'
     &/10X,'3. EXIT THE PROGRAM ')
  670      FORMAT (//10X,'WHICH OF THE COLUMNS CONTAINS THE X VALUES?')
  680      FORMAT (//10X,'WHICH OF THE COLUMNS CONTAINS THE Y VALUES?')
  690      FORMAT (//10X,'WHICH OF THE COLUMNS CONTAINS THE Z VALUES?')
       END
C*************************************************************************
C*************************************************************************
C**** REV3D                                                            ****
C****            SUBROUTINE TO REVISE OLD GRAPHS.                      ****
C****                                                                  ****
C*************************************************************************
C*************************************************************************
       SUBROUTINE REV3D
```

```
C
C   DECLARATIONS.
C
      REAL BR
      INTEGER I
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), LRAY(11)
     &,X(18,100), Y(18,100), LINE(2), XPLOT(100),YPLOT(100),TEMPLT(2)
     &,  ZPLOT(100), Z(18,100), JCOLOR(25)
C
C   DETERMINES WHICH AREA THE USER WISHES TO UPDATE.
C
 5    CALL FRTCMS ('CIRSCRN ')
 6    WRITE (6,610)
      CALL FEEDIN(I,87)
         IF(I.GT.0 .AND. I .LT. 19) GO TO 10
 7       CALL ERROR4(1,18)
         GO TO 6
 10   CONTINUE
      CALL FRTCMS ('CIRSCRN ')
      GO TO (11,22,33,44,55,66,77,88,99,100,111,112,113,114,115,116,117
     &,118),I
C
C   SUBROUTINE PAGE2D WILL UPDATE THE PAGE SIZE OF THE GRAPH.
C
 11   CALL PAGE2D
      GO TO 5
C
C   SUBROUTINE SUBPLT WILL UPDATE THE SIZE OF THE SUBPLOT AREA.
C
 22   CALL SUBPLT
      GO TO 5
C
C   SUBROUTINE HEADNG WILL CHANGE THE TITLE OF THE GRAPH.
C
 33   CALL HEADNG
      GO TO 5
C
C   SUBROUTINE XAXIS WILL CHANGE THE TITLE OF THE X-AXIS.
C
 44   CALL XAXIS
      GO TO 5
C
C   SUBROUTINE YAXIS WILL CHANGE THE TITLE OF THE Y-AXIS.
C
 55   CALL YAXIS
      GO TO 5
C
C   SUBROUTINE ZAXIS WILL CHANGE THE TITLE OF THE Z-AXIS.
C
```

```
 66    CALL ZAXIS
       GO TO 5
C
C  SUBROUTINE MESS WILL UPDATE THE INFORMATION FOR THE MESSAGE.
C
 77    CALL MESS(2)
       GO TO 5
 88    CALL MESS(3)
       GO TO 5
C
C  SUBROUTINE LOCLEG WILL UPDATE THE INFORMATION FOR THE LEGEND.
C
 99    CALL LOCLEG
       GO TO 5
C
C  SUBROUTINE XVALUE WILL UPDATE THE SCALE INFORMATION ON THE X-AXIS.
C
 100   CALL XVALUE
       GO TO 5
C
C  SUBROUTINE YVALUE WILL UPDATE THE SCALE INFORMATION ON THE Y-AXIS.
C
 111   CALL YVALUE
       GO TO 5
C
C  SUBROUTINE ZVALUE WILL UPDATE THE SCALE INFORMATION ON THE Z-AXIS.
C
 112   CALL ZVALUE
       GO TO 5
C
C  SUBROUTINE GRID3D WILL UPDATE THE INFORMATION ON THE GRID PATTERN.
C
 113   CALL GRID3D
       GO TO 5
C
C  SUBROUTINE UPCRVS WILL UPDATE THE CURVE INFORMATION.
C
 114   CALL UPCR3D
       GO TO 5
C
C  SUBROUTINE STYLE WILL UPDATE THE LETTER TYPE.
C
 115   CALL STYLE
       GO TO 5
C
C  SUBROUTINE HELP2 INSTRUCTS USER ON THE USE OF THIS MENU.
C
 116   CALL HELP2
       GO TO 5
```

```
C
C  SUBROUTINE PLOT2D WILL PLOT THE GRAPH TO BE REVISED.
C
 117  CALL PLOT3D
      GO TO 5
 118  CONTINUE
      CALL FRTCMS ('CIRSCRN ')
      RETURN
C
C  FORMAT STATEMENTS.
C
 610     FORMAT(/10X,'WHICH AREA WOULD YOU LIKE TO UPDATE.'
     &/15X,'1.   PAGE SIZE'
     &/15X,'2.   SUBPLOT AREA'
     &/15X,'3.   GRAPH TITLE'
     &/15X,'4.   X-AXIS TITLE'
     &/15X,'5.   Y-AXIS TITLE'
     &/15X,'6.   Z-AXIS TITLE'
     &/15X,'7.   MESSAGE STATEMENT'
     &/15X,'8.   MESSAGE LOCATION CHANGE'
     &/15X,'9.   LEGEND LOCATION CHANGE'
     &/15X,'10.  X-AXIS SCALE'
     &/15X,'11.  Y-AXIS SCALE'
     &/15X,'12.  Z-AXIS SCALE'
     &/15X,'13.  GRID'
     &/15X,'14.  CHANGE CURVES'
     &/15X,'15.  CHANGE THE TYPE OF LETTERING'
     &/15X,'16.  HELP'
     &/15X,'17.  PLOT THE UPDATED GRAPH'
     &/15X,'18.  NO CHANGES')
      END
C*****************************************************************************
C*****************************************************************************
C**** UPCR3D                                                              ****
C****                                                                     ****
C****     SUBROUTINE TO UPDATE DECISIONS ON CURVES AND DATA.              ****
C****                                                                     ****
C****                VARIABLES AND CONSTANTS                              ****
C****                                                                     ****
C****  INGRAY(2,I) NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE.         ****
C****                                                                     ****
C****  INGRAY(3,I) NUMBER OF POINTS TO BE MARKED FOR THIS CURVE.          ****
C****                                                                     ****
C****  INGRAY(6,I) THE COLOR THAT THIS CURVE IS TO BE DRAWN.              ****
C****                                                                     ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE UPCR3D
C
```

```
C  DECLARATIONS.
C
      REAL ER
      INTEGER J,I,JJ,K,KK,KKK,I,LL
      COMMON RELRAY(6,18),  INGRAY(7,13),  LETRAY(10,28),  IRAY(11)
     &  ,X(18,100),  Y(18,100),  LINE(72),XPLOT(100),YPLOT(100),PTPLT(2)
     &,   ZPLOT(100),  Z(18,100),  JCOLOR(25)
 10      CALL FRTCMS ('CLRSCRN ')
C
C  DETERMINES WHICH FUNCTION USER WISHES TO PERFORM: UPDATE, ADD,
C  OR DELETE A CURVE.
 20    WRITE(6,610)
       CALL REEDIN(NN,825)
       J = NN
          IF (J .GT. 0 .AND. J  .LT. 6) GO TO 30
 25           CALL ERRCR4(1,5)
              GO TO 20
 30     GO TO (41,180,33,35,310),J
C
C  DETERMINES WHICH CURVE THE USER WISHES TO DELETE.
C
 33    CALL FRTCMS ('CLRSCRN ')
       CALL DCURVE
       CALL FRTCMS ('CLRSCRN ')
       GO TO 20
C
C  SUBROUTINE HELP4 EXPLAINS THE MENU TO THE USER.
C
 35    CALL HELP4
       GO TO 20
C
C  DETERMINES WHICH CURVE THE USER WISHES TO UPDATE.
C
 41    CALL FRTCMS ('CLRSCRN ')
 50    WRITE (6,620)
       CALL REEDIN(NN,855)
          I = NN
          IF (I .GT. 0 .AND. I .LT. 19) GO TO 60
              CALL ERRCR7
              GO TO 50
 55           CALL ERRCR8
              GO TO 50
 60    CALL FRTCMS ('CLRSCRN ')
C
C  DETERMINES WHICH AREA OF THE CURVE THE USER WISHES TO UPDATE: TITLE,
C  DATA POINTS, ADD DATA POINTS, DELETE DATA POINTS,
C  FILE NAME, NUMBER OF DATA POINTS TO BE MARKED, ETC.
C  PATTERN OF LINE DRAWN.
C
```

```
 70    WRITE(6,630) I
       CALL REEDIN(NN,875)
          IF (NN .GT. 0 .AND. NN.LT.11) GO TO 80
 75          CALL ERROR4 (1,10)
             GO TO 70
 80        J = NN
       CALL FRTCMS ('CIRSCRN ')
        GO TO (90,110,120,130,140,150,160,170,175,10),I
C
C  DETERMINES THE NEW TITLE FOR THE CURVE THE USER DESIRES.
C
 90       WRITE (6,640) I
          J = 5 +I
          READ (5,510,END=100) (LETRAY(K,J),K=1,9)
               CALL LETTER(J,JJ)
               IF (JJ.LT.10) GO TO 60
               CALL ERROR3
               GO TO 90
 100           CALL ERROR8
               GO TO 90
C
C  UPDATES THE DATA POINTS FOR THE USER DESIRED CURVE.
C
 110      KKK = INGRAY(2,I)
          CALL DTCH3D (I,KKK)
          GO TO 60
C
C  ADDS A DATA POINT TO THE CURVE.
C
 120   CALL APNT3D(I)
       CALL FRTCMS ('CIRSCRN ')
       GO TO 60
C
C  DELETES A DATA POINT FROM THE CURVE.
C
 130   CALL DPNT3D(I)
       CALL FRTCMS ('CIRSCRN ')
       GO TO 60
C
C  CHANGES THE DATA FILE THE USER WISHES TO USE FOR THAT CURVE.
C
 140      IKK = I
          CALL USRF3L(IKK)
          GO TO 60
C
C  USER DESIGNATES NUMBER OF DATA POINTS HE WISHES [illegible]
C
 150   WRITE (6,634)
```

```
      CALL FEEDIN(NN,&155)
      INGRAY(3,I) = NN
         IF (IABS(INGRAY(3,I)).LE. INGRAY(2,I)) GO TO 60
            LL = INGRAY(2,I)
            CALL ERROR4(-LL,LL)
            GO TO 150
155         CALL ERROR8
            GO TO 150
C
C  DETERMINES LINE PATTERN TO BE DRAWN.
C
160   CALL PATNER (LP)
      INGRAY(6,I) = IP
      GO TO 60
C
C  DETERMINES CURVE FIT TO BE USED.
C
170   CALL FITTYP (I)
      GO TO 60
C
C  SUBROUTINE HELP5 EXPLAINS THE MENU TO THE USER.
C
175   CALL HELP5
      GO TO 60
C
C  ADDS A CURVE TO THE GRAPH.
C
180     INGRAY(1,4) = INGRAY(1,4) +1
      I = INGRAY(1,4)
      IF (I .LT. 19) GO TO 185
      CALL ERROR7
      GO TO 70
185   CALL FRTCMS ('CIRSCEN ')
C
C  DETERMINES THE TITLE OF THE CURVE TO BE ADDED.
C
190      WRITE (6,640) I
         J = 5 +I
         READ (5,510,END=195) (LETRAY(K,J),K=1,9)
              CALL LETTER(J,JJ)
              IF (JJ.LT.10) GO TO 200
              CALL ERROR3
              GO TO 190
195           CALL ERROR8
              GO TO 190
C
C  DETERMINES LINE PATTERN TO BE DRAWN.
C
200   CALL PATNER (LP)
```

```
      INGRAY(6,I) = IF
C
C  DETERMINES THE METHOD THE USER WISHES TO USE TO INPUT DATA FOR THIS
C  NEW CURVE.
C
 210      WRITE (6,650)
          CALL REEDIN(NN,&215)
             IF (NN.EQ.1 .OR. NN.EQ.2) GO TO 220
 215            CALL ERROR4(1,2)
                GO TO 210
 220         GO TO (230,290),NN
C
C  DETERMINES HOW MANY POINTS THE USER WISHES TO PLOT.
C
 230      WRITE (6,660)
          CALL REEDIN(NN,&235)
               IF (NN .LT. 100.) GO TO 240
               CALL ERROR5
                    GO TO 230
 235           CALL ERROR3
                    GO TO 230
 240           INGRAY(2,I) = NN
C
C  DESIGNATES NUMBER OF DATA POINTS USER WISHES MARKED OR READ.
C
          CALL FRTCMS ('CLRSCRN ')
 250   WRITE (6,634)
       CALL REEDIN(NN,&255)
       INGRAY(3,I) = NN
          IF (IABS(INGRAY(3,I)).LE. INGRAY(2,I)) GO TO 260
              LL= INGRAY(2,I)
              CALL ERROR4(-LL,LL)
              GO TO 250
 255          CALL ERROR8
              GO TO 250
C
C  INPUTS THE DATA POINTS A POINT AT A TIME FROM THE TERMINAL.
C
 260             KKK= INGRAY(2,I)
              DO 280 JJ=1, KKK
                 CALL FRTCMS ('CLRSCRN ')
 270             WRITE (6,67) JJ,KKK
                 READ (5,*,END=275) X(I,JJ), Y(I,JJ), Z(I,JJ)
                      GO TO 280
 275                  CALL ERROR6
                      GO TO 270
 280          CONTINUE
C
C  SUBROUTINE DTCH3D WILL ALLOW USER TO VERIFY HIS DATA.
```

```
C
            CALL DTCH3D(1,KKK)
               GO TO 10
C
C  SUBROUTINE USRF3L READS USER DESIGNATED FILE FOR DATA POINTS.
C
 290        IKK = I
            CALL USRF3L (IKK)
            IF (IKK .EQ. -1) GO TO 190
C
C  SUBROUTINE DTCH3D WILL ALLOW USER TO VERIFY HIS DATA.
C
            CALL DTCH3D(I,KKK)
               GO TO 10
 310     CONTINUE
      RETURN
C
C  FORMAT STATEMENTS.
C
 510      FORMAT (9A4)
 610      FORMAT(//10X,'WHICH OF THE FOLLOWING IO YOU WISH TO PERFORM?'
     &/15X,'1.   UPDATE AN EXISTING CURVE?'
     &/15X,'2.   ADD A CURVE?'
     &/15X,'3.   DELETE A CURVE?'
     &/15X,'4.   HELP'
     &/15X,'5.   TERMINATE EDITING?')
 620      FORMAT(//10X,'WHICH CURVE DO YOU WISH TO UPDATE? (1 THRU 18)')
 630      FORMAT(//10X,'WHICH AREA OF THIS CURVE',I2,
     &' DO YOU WISH TO UPDATE?'
     &/15X,'1. CURVE TITLE.'
     &/15X,'2. CHECK DATA POINTS.'
     &/15X,'3. ADD A DATA POINT.'
     &/15X,'4. DELETE A DATA POINT.'
     &/15X,'5. CHANGE FILE NAME OF DATA POINTS.'
     &/15X,'6. CHANGE THE NUMBER OF DATA POINTS TO BE MARKED.'
     &/15X,'7. CHANGE THE LINE PATTERN TO BE DRAWN.'
     &/15X,'8. CHANGE THE TYPE OF CURVE INTERPOLATION USED.'
     &/15X,'9. HELP.'
     &/15X,'10. TERMINATE EDITING ON THIS CURVE.')
 634      FORMAT(//30X,'MARKER SYMBOL INFORMATION'//
     &8X,'A POSITIVE NUMBER--POINTS WILL BE CONNECTED AND MARKER SYMBOL
     &S DESIGNATED'
     &/14X,'(I.E. (1) =  *--------*--------*--------*--------*)'
     &/ 8X,'ZERO (0) --POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.'
     &/14X,'(I.E. (0) =  ----------------------------------)'
     &/8X,'A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBO
     &LS ONLY.'
     &/14X,'(I.E.(-1) =  *        *        *        *        *)'
     &//10X,'EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND
```

```
     &CONNECTED'/24X,'BY A LINE)'
     &// 5X,'HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DI
     &SPLAYED?')
 640     FORMAT(//10X,'WHAT IS THE NEW TITLE OF CURVE',I3,' ?'/15X,
     &                '(32 CHARACTERS MAX)')
 650          FORMAT (///10X,'WHICH METHOD DO YOU WISH TO USE TO INPUT T
     &HIS CURVES DATA?'/
     &16X,'1.TYPE IN DATA ONE POINT AT A TIME.'
     &/16X,'2. USE DATA FILE INPUT.')
 660     FORMAT(//10X,'HOW MANY POINTS DO YOU WISH TO PLOT ON THIS CURVE
     &? (100 MAX)')
 670     FORMAT (//10X,'X-COORDINATE, Y-COORDINATE, AND Z-COORDINATE IN
     &IN YOUR UNITS,'/13X,'POINT ',I3,' OF ',I3,' POINTS.')
      END
C*****************************************************************************
C*****************************************************************************
C**** DICH3D                                                                ****
C****                                                                       ****
C****       SUBROUTINE TO VERIFY DATA FOR EACH GRAPH.                       ****
C****                                                                       ****
C****                 VARIABLES AND CONSTANTS                               ****
C****                                                                       ****
C****  X       2-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT.        ****
C****                                                                       ****
C****  Y       2-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT.        ****
C****                                                                       ****
C****  Z       2-DIMENSIONAL ARRAY FOR Z-COORDINATE OF A DATA POINT.        ****
C****                                                                       ****
C****  I       THE CURVE NUMBER.                                            ****
C****                                                                       ****
C****  J       THE NUMBER OF POINTS TO BE CHECKED FOR THIS CURVE.           ****
C****                                                                       ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE DTCH3D(I,J)
C
C  DECLARATIONS.
C
      REAL RR
      INTEGER J,I,JJ,IDIC,NN,II,N
      COMMON RELRAY(6,13), INGRAY(7,13), LETRAY(10,24), [illegible](11)
     & ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),[illegible](2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
      KK = 5
      K = 1
 10   CALL FRTCMS ('CIRSCRN ')
C
C  DETERMINES IF THE USER WISHES TO CONTINUE TO UPDATE DATA.
C
```

```
      CALL FRTCMS ('CLRSCRN ')
      WRITE (6,600) I
C
C  SUBROUTINE YORN DETERMINES IF THE ANSWER WAS YES, NO, OR ERROR.
C
      CALL YORN(IDIC)
      GO TO (20,80,10),IDIC
C
C  PRINTS ON THE SCREEN FIVE DATA POINTS AT A TIME FOR THE USER
C  TO CHECK.
C
 20   WRITE (6,610) I
 25   DO 30 NN = K, KK
      WRITE (6,620) NN, X(I,NN), Y(I,NN), Z(I,NN)
 30   CONTINUE
C
C  DETERMINES FROM THE USER IF THESE DATA POINTS ARE CORRECT.
C
 35   WRITE (6,630) I
C
C  SUBROUTINE YORN DETERMINES IF THE ANSWER WAS YES, NO, OR ERROR.
C
      CALL YORN (IDIC)
      GO TO (60,40,20), IDIC
C
C  DETERMINES WHICH PAIR THE USER WISHES TO CHANGE.
C
 40   WRITE (6,640)
      CALL REEDIN(NN,&45)
           II = NN
           IF (II.LT.K.OR.II.GT.KK) GO TO 50
           IF(II.NE.J) GO TO 50
              CALL ERROR4(K,J)
              GO TO 20
 45           CALL ERROR8
              GO TO 40
C
C  DETERMINES THE UPDATED DATA FROM THE USER.
C
 50   WRITE (6,650)
      READ (5,*,END=70) X(I,II), Y(I,II), Z(I,II)
      CALL FRTCMS ('CLRSCRN ')
           GO TO 20
 60   IF(KK.GE.J) GO TO 80
        K = KK + 1
        KK = KK + 5
        CALL FRTCMS ('CLRSCRN ')
        GO TO 20
 70     CALL ERROR8
```

```
      GO TO 50
 30   RETURN
C
C  FORMAT STATMENTS.
C
 600    FORMAT(//6X,'DO YOU WISH TO CHECK THE DATA INPUT FOR CURVE',
     &I2,' ? (Y OR N)')
 610    FORMAT (//14X,'CURVE NUMBER',I2
     &/10X,'X-VALUE',7X,'Y-VALUE',7X,'Z-VALUE')
 620    FORMAT(5X,I3,2X,1PE12.5,3X,1PE12.5,3X,1PE12.5)
 630    FORMAT(/10X,'ARE THESE DATA POINTS CORRECT FOR CURVE',I2,
     &' ? (Y OR N)')
 640      FORMAT(//10X,'WHICH X,Y,Z COORDINATE DO YOU WISH TO CHANGE:
     &(INPUT # OF INDEX)')
 650    FORMAT(//10X,'INPUT NEW X-COORDINATE, Y-COORDINATE, AND Z-COORD
     &INATE')
      END
C*****************************************************************************
C*****************************************************************************
C**** DPNT3D                                                                 ****
C****                                                                       ****
C****          SUBROUTINE TO DELETE A DATA POINT.                           ****
C****                                                                       ****
C****                VARIABLES AND CONSTANTS                                ****
C****                                                                       ****
C****  X              TWO-DIMENSIONAL ARRAY FOR X-COORDINATE OF             ****
C****                 A DATA POINT.                                         ****
C****                                                                       ****
C****  Y              TWO-DIMENSIONAL ARRAY FOR Y-COORDINATE OF             ****
C****                 A DATA POINT.                                         ****
C****                                                                       ****
C****  IC             THE CURVE NUMBER.                                     ****
C****                                                                       ****
C****  INGRAY(2,KK)   NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE.        ****
C****                                                                       ****
C****  JD             NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE.        ****
C****                                                                       ****
C****                                                                       ****
C****                                                                       ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE DPNT3D (IC)
C
C  DECLARATIONS.
C
      INTEGER I, IC, JD, N, II, J
      REAL R
      COMMON RELPAY(6,18), INGRAY(7,18), [illegible]
     [illegible],X(18,100), Y(18,100), [illegible]
```

```
     &,  ZPLOT(100), Z(13,100), JCOLOR(25)
C
 10    WRITE (6,610)
       JD = INGRAY(2,IC)
       DO 20 I = 1, JD
          WRITE (6,620) I, X(IC,I), Y(IC,I), Z(IC,I)
 20    CONTINUE
C
C  DETERMINES IF USER STILL WISHES TO DELETE A POINT.
C
 25    WRITE (6,630)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
          CALL YORN(IDIC)
       CALL FRTCMS ('CIRSCRN ')
          GO TO (35,60,25),IDIC
C
C  DETERMINES WHICH POINT THE USER WANTS DELETED AND EXECUTES.
C
 30    WRITE (6,640)
          CALL REEDIN(NN,&35)
             N = NN
             IF (N .GT. 0 .AND. N .LE. JD ) GO TO 40
             CALL ERROR4(1,JD)
                GO TO 30
 35          CALL ERROR8
                GO TO 30
 40          II = INGRAY(2,IC)
       DO 50 J = N, II
          X(IC,J-1) = X(IC,J)
          Y(IC,J-1) = Y(IC,J)
          Z(IC,J-1) = Z(IC,J)
 50       CONTINUE
       INGRAY(2,IC) = II - 1
       X(IC,II) = 0.0
       Y(IC,II) = 0.0
       Z(IC,II) = 0.0
 60    RETURN
C
C    FORMAT STATEMENTS.
C
 610   FORMAT(//10X,'THIS IS A CURRENT LISTING OF YOUR DATA POINTS, SIZE
      & AT A TIME.'
      & /10X,'NUMBER',10X,'X VALUE',10X,'Y VALUE',10X,'Z VALUE'/)
 620   FORMAT (/12X, I3,5X,1PE12.5,5X,1PE12.5,5X,1PE12.5)
 630   FORMAT (//10X,'DO YOU STILL WISH TO DELETE A POINT. (Y OR N)')
 640   FORMAT (//10X,'INPUT THE NUMBER OF THE POINT YOU WISH TO DELETE.')
       END
```

```
C*****************************************************************************
C*****************************************************************************
C**** APNT3D                                                                 ****
C****                                                                        ****
C****          SUBROUTINE TO ADD A DATA POINT.                               ****
C****                                                                        ****
C****               VARIABLES AND CONSTANTS                                  ****
C****                                                                        ****
C****   X      2-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT.         ****
C****                                                                        ****
C****   Y      2-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT.         ****
C****                                                                        ****
C****   Z      2-DIMENSIONAL ARRAY FOR Z-COORDINATE OF A DATA POINT.         ****
C****                                                                        ****
C****   IC     THE CURVE NUMBER.                                             ****
C****                                                                        ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE APNT3D (IC)
C
C  DECLARATIONS.
C
      INTEGER I, N, NN, J, II, IDIC
      REAL R
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), [illegible]RAY(11)
     &  ,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,  ZPLOT(100), Z(18,100), JCOLOR(25)
      JD = INGRAY(2,IC)
      IF (JD .LT. 100) GO TO 10
         CALL ERROR5
      GO TO 60
 10   WRITE (6,610)
      DO 20 I = 1, JD
         WRITE (6,620) I, X(IC,I), Y(IC,I), Z(IC,I)
 20   CONTINUE
C
C  DETERMINES IF USER STILL WISHES TO DELETE A POINT.
C
 25      WRITE (6,630)
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
         CALL YORN(IDIC)
      CALL IRTCMS ('CIRSCRN ')
         GO TO (35,60,25),IDIC
 30   WRITE (6,640)
         CALL REEDIN(N,835)
           IF (N .GT. 0 .AND. N .LE. JD) GO TO 40
           CALL ERROR4(1,JD)
```

```
                GO TO 30
 35          CALL ERROR8
                GO TO 30
 40     II = 99 - N
        INGRAY(2,IC) = INGPAY(2,IC) + 1
        DO 50 J = 1, II
           X(IC,101-J) = X(IC,100-J)
           Y(IC,101-J) = Y(IC,100-J)
           Z(IC,101-J) = Z(IC,100-J)
 50     CONTINUE
        WRITE(6,650)
        READ(5,*,END=55) X(IC,N+1), Y(IC,N+1), Z(IC,N+1)
              GO TO 60
 55           REWIND 5
              CALL ERRCR8
              GO TO 50
 60     RETURN
C
C    FORMAT STATEMENTS.
C
 610   FORMAT(//10X,'THIS IS A CURRENT LISTING OF YOUR DATA POINTS.'
     & /10X,'NUMBER',10X,'X VALUE',10X,'Y VALUE',10X,'Z VALUE'/)
 620   FORMAT (/12X, I3,3(5X,1PE12.5))
 630   FORMAT (//10X,'DO YOU STILL WISH TO ADD A POINT? (Y OR N)')
 640   FORMAT (// 5X,'INPUT THE NUMBER OF THE POINT AFTER WHICH THE NEW P
     &OINT WILL BE ADDED:')
 650   FORMAT (//10X,'WHAT IS THE NEW DATA POINT? (X,Y,Z)')
       END
C*****************************************************************************
C*****************************************************************************
C****  EXAM3D                                                              ****
C****                                                                      ****
C****          SUBROUTINE DISPLAYING A 3-D EXAMPLE FOR USER.               ****
C****                                                                      ****
C****               VARIABLES AND CONSTANTS                                ****
C****                                                                      ****
C****    I          INDEX VALUES.                                          ****
C****                                                                      ****
C*****************************************************************************
C*****************************************************************************
C
      SUBROUTINE EXAM3D
C
C  DECLARATIONS.
C
      INTEGER I, N, J, II, IP(800)
      REAL ER
      COMMON RELRAY(6,18), INGRAY(7,18), [illegible]
     & ,X(18,100), Y(18,100), [illegible]
```

```
     &,  ZPLOT(100), Z(13,100), JCOLOR(25)
C
C   ALGORITHM CALCULATION
C
      DO 10  I = 1,10
         ZPLOT(I) =  FLOAT(I)
         YPLOT(I) =  FLOAT(I)*2
         XPLOT(I) =  FLOAT(I)*.9
10    CONTINUE
C   ALGORITHM FIGURE1
C
      CALL HWSCAI('SCREEN')
      CALL PAGE(8.5 ,11.)
      CALL AREA2D (7.5 ,7.5)
      CALL SHDCHR(90.,1,.005,1)
      CALL SWISSL
      CALL MESSAG('(MESSAGE)$',100,6.0,-.3)
      CALL HEADIN ('3-D EXAMPLE GRAPH$',100,1.5,1)
      CALL HEIGHT (.20)
      CALL X3NAME ('X-AXIS$',100)
      CALL Y3NAME ('Y-AXIS$',100)
      CALL Z3NAME ('Z-AXIS$',100)
      CALL VOLM3D(7. ,7. ,7. )
      CALL VUABS (-1.5* 7.,-1.5* 7.,1.5*  7.)
      CALL RESET('HEIGHT')
      CALL GRAF3D(10.,-1.0,  0.0,20.,-2.0,  0.0,0.0,1.0,10.0)
      CALL PASPLN(0)
      CALL CURV3D(XPLOT,YPLOT,ZPLOT,10,1)
C     PLANE A
      CALL GRFITI( 0.0, 7.,0.0, 1.0, 7., 0.,5. , 7.0,1.0)
      CALL AREA2D(7. ,7. )
      CALL HEIGHT (.20)
      CALL LINES ('CURVE 1$',IP,1)
C   REVERSER X AXIS
      CALL GRAF(10.0,-1.0,  0.0,0.0,1.0,10.0)
      CALL CURVE (XPLOT,ZPLOT,10,1)
      CALL LEGEND(IP,1,1.0,2.0)
      CALL BLREC(.9,1.9,2.0,.8,-2)
      CALL HEIGHT (.30)
      CALL MESSAG('PLANE A$',100,3.6,5.5)
      CALL BLREC(3.4,5.4,2.1,.5,-2)
      CALL DOT
      CALL GRID(1,1)
      CALL END3GR(0)
C     PLANE B
      CALL GRFITI(7.0,7.0,0.0,7.0,0.0,0.0,7.0,0.0,1.0)
      CALL AREA2D(7.0,7.0)
      CALL GRAF(0.0,2.0,20.0,0.0,1.0,10.0)
      CALL MESSAG('PLANE B$',100,3.0,4.0)
```

```
      CALL PLREC(3.4,4.7,2.2,.5,-2)
      CALL CURVE (YPLOT,ZPLOT,10,1)
      CALL DOT
      CALL GRID(1,1)
      CALL END3GR(0)
C     PLANE C
      CALL GRFITI(0.0,0.0,0.0,10.0,0.0,0.0,0.0,10.0,0.0)
      CALL AREA2D(7.,7.)
      CALL GRAF(10.0,1.0,0.0,20.0,2.0,0.0)
      CALL MESSAG ('PLANE C$',100, 4.6,1.8)
      CALL PLREC(3.8,1.6,2.2,.7,-2)
      CALL CURVE (XPLOT,YPLOT,10,1)
      CALL DOT
      CALL GRID(1,1)
      REIRAY(1,1) = 8.5
      REIRAY(1,2) = 11.0
      REIRAY(1,3) = 7.5
      REIRAY(1,4) = 7.5
      REIRAY(1,5) = 1.0
      REIRAY(1,6) = 2.0
      REIRAY(2,1) = 0.0
      REIRAY(2,2) = 1.0
      REIRAY(2,3) = 10.0
      REIRAY(2,4) = 0.0
      REIRAY(2,5) = 2.0
      REIRAY(2,6) = 20.0
      REIRAY(3,1) = 0.0
      REIRAY(3,2) = 1.0
      REIRAY(3,3) = 10.0
      REIRAY(4,5) = 6.0
      REIRAY(4,6) = -.5
      CALL END3GR(0)
      CALL ENDPL(0)
      REIRAY(1,1) = 8.5
      REIRAY(1,2) = 11.0
      REIRAY(1,3) = 7.5
      REIRAY(1,4) = 7.5
      REIRAY(1,5) = 1.0
      REIRAY(1,6) = 2.0
      REIRAY(2,1) = 0.0
      REIRAY(2,2) = 1.0
      REIRAY(2,3) = 10.0
      REIRAY(2,4) = 0.0
      REIRAY(2,5) = 2.0
      REIRAY(2,6) = 20.0
      REIRAY(3,1) = 0.0
      REIRAY(3,2) = 1.0
      REIRAY(3,3) = 10.0
      REIRAY(4,5) = 6.0
```

```
      RELRAY(4,6) = -.5
C
C   END FIGURE1
C
      RETURN
      END
C*****************************************************************************
C*****************************************************************************
C**** GRID3D                                                                 ****
C****        SUBROUTINE TO DETERMINE THE GRID LINE PATTERN.                  ****
C****                                                                        ****
C****                VARIABLES AND CONSTANTS                                 ****
C****                                                                        ****
C****    INGRAY(1,5) NUMBER OF GRID LINES PER X-AXIS X,Y PLANE.              ****
C****                                                                        ****
C****    INGRAY(1,6) NUMBER OF GRID LINES PER Y-AXIS X,Y PLANE.              ****
C****                                                                        ****
C****    INGRAY(5,2) NUMBER OF GRID LINES PER X-AXIS X,Z PLANE.              ****
C****                                                                        ****
C****    INGRAY(5,3) NUMBER OF GRID LINES PER Z-AXIS X,Z PLANE.              ****
C****                                                                        ****
C****    INGRAY(5,4) NUMBER OF GRID LINES PER Y-AXIS Y,Z PLANE.              ****
C****                                                                        ****
C****    INGRAY(5,5) NUMBER OF GRID LINES PER Z-AXIS Y,Z PLANE.              ****
C****                                                                        ****
C****    IFRAY(4)    WHETHER OR NOT GRAPH HAS GRID LINES.                    ****
C****                                                                        ****
C****    IDIC        USED TO STORE YES OR NO ANSWERS.                        ****
C****                                                                        ****
C****    I           INDEX.                                                  ****
C****                                                                        ****
C****    RR          DUMMY REAL VALUE.                                       ****
C****                                                                        ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE GRID3D
C
C   DECLARATIONS.
C
      INTEGER I, IDIC, LP
      REAL RR
      COMMON RELRAY(6,18), INGRAY(7,18), RETRAY(10,24), IFRAY(11)
     &, X(18,100), Y(18,100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
     &, ZPLOT(100), Z(18,100), JCOLOR(25)
      IFRAY(4) = 2
C
C   DECISION ON WHETHER OR NOT TO HAVE GRID LINES.
C
 10   WRITE (6,610)
```

```
C
C  SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
         CALL YORN(IDIC)
         GO TO (20,120,10),IDIC
 20      IFRAY(4) = 1
C
C  DETERMINES HOW MANY GRID LINES PER X-AXIS STEP INTERVAL PLANE A.
C
 30    WRITE(5,650)
       WRITE(5,620)
       CALL REEDIN(NN,835)
          INGRAY(5,2) = NN
          GO TO 40
 35          CALL ERRCR8
             GO TO 30
C
C  DETERMINES HOW MANY GRID LINES PER Z-AXIS STEP INTERVAL PLANE A.
C
 40    WRITE (6,640)
       CALL REEDIN(NN,845)
          INGRAY(5,3) = NN
          GO TO 50
 45          CALL ERRCR8
             GO TO 40
C
C  DETERMINES THE LINE PATTERN TO BE USED.
C
 50    CALL IATNER(LP)
         INGRAY(7,1) = LP
C
C  DETERMINES HOW MANY GRID LINES PER Z-AXIS STEP INTERVAL PLANE B.
C
       CALL ERTCMS ('CIRSCRN ')
 60    WRITE(5,660)
       WRITE(5,630)
       CALL REEDIN(NN,865)
          INGRAY(5,4) = NN
          GO TO 70
 65          CALL ERRCR8
             GO TO 60
C
C  DETERMINES HOW MANY GRID LINES PER Z-AXIS STEP INTERVAL PLANE C.
C
 70    WRITE (6,640)
       CALL REEDIN(NN,875)
          INGRAY(5,5) = NN
          GO TO 80
 75          CALL ERRCR8
```

```
            GO TO 70
C
C  DETERMINES THE LINE PATTERN TO BE USED.
C
 80    CALL PATNER(LP)
         INGRAY(7,2) = LP
C
C  DETERMINES HOW MANY GRID LINES PER X-AXIS STEP INTERVAL PLANE C.
C
       CALL FRTCMS ('CIRSCRN ')
 90    WRITE(5,670)
       WRITE(5,620)
       CALL REEDIN(NN,895)
          INGRAY(1,5) = NN
          GO TO 100
 95          CALL ERROR8
             GO TO 90
C
C  DETERMINES HOW MANY GRID LINES PER Y-AXIS STEP INTERVAL PLANE C.
C
 100   WRITE (6,640)
       CALL REEDIN(NN,8105)
          INGRAY(1,6) = NN
          GO TO 110
 105         CALL ERROR8
             GO TO 100
C
C  DETERMINES THE LINE PATTERN TO BE USED.
C
 110   CALL PATNER(LP)
         INGRAY(5,6) = LP
 120   RETURN
C
C  FORMAT STATEMENTS.
C
 610   FORMAT(//10X,'THE FOLLOWING QUESTIONS PERTAIN TO THE GRID SYSTEM',
      8//12X,'DO YOU WANT THE GRAPH TO HAVE GRID LINES? (Y OR N)')
 620   FORMAT(//12X,'HOW MANY GRID LINES PER X-AXIS STEP INTERVAL?')
 630   FORMAT(//12X,'HOW MANY GRID LINES PER Y-AXIS STEP INTERVAL?')
 640   FORMAT(//12X,'HOW MANY GRID LINES PER Z-AXIS STEP INTERVAL?')
 650   FORMAT(//10X,'THE FOLLOWING QUESTIONS PERTAIN TO PLANE X,Z.')
 660   FORMAT(//10X,'THE FOLLOWING QUESTIONS PERTAIN TO PLANE Y,Z.')
 670   FORMAT(//10X,'THE FOLLOWING QUESTIONS PERTAIN TO PLANE X,Y.')
       END
C*****************************************************************************
C*****************************************************************************
C**** HELP1                                                                ****
C****                                                                      ****
C****                    HELP1 FIRST [illegible].                              ****
```

```
C****                                                                  ****
C**********************************************************************
C**********************************************************************
      SUBROUTINE HELP1
         CALL FRTCMS ('CLRSCRN ')
         CALL HELPEX
         WRITE (6,600)
         WRITE (6,601)
         WRITE (6,602)
         WRITE (6,603)
         WRITE (6,604)
         WRITE (6,605)
         WRITE (6,606)
         WRITE (6,607)
         WRITE (6,608)
         WRITE (6,609)
         WRITE (6,610)
         WRITE (6,611)
         WRITE (6,612)
         WRITE (6,613)
         WRITE (6,614)
         WRITE (6,615)
         WRITE (6,616)
         WRITE (6,617)
10       RETURN
C
C    FORMAT STATEMENTS.
C
 510          FORMAT (I3)
 600          FORMAT (/25X,'**** HELP **** ')
 601   FORMAT (// 5X,'1. PAGE SIZE--THE PAGE DIMENSIONS THAT YOU WISH FOR
     & YOUR GRAPH.')
 602   FORMAT (// 5X,'2. SUBPLOT AREA--THAT AREA OF THE PAGE YOU WISH TO
     &BE CONTAINED BY'
     &/5X,'THE GRAPH ALLOWING FOR TITLES, BORDERS,ETC...')
 603   FORMAT (// 5X,'3. GRAPH TITLE--A ONE LINE GRAPH HEADING HAVING A M
     &AXIMUM LENGTH'
     &/5X,'OF 32 CHARACTERS.')
 604   FORMAT (// 5X,'4. X-AXIS TITLE--A ONE LINE DESCRIPTION OF THE X-AX
     &IS,'
     &/5X,'32 CHARACTERS MAXIMUM.')
 605   FORMAT (// 5X,'5. Y-AXIS TITLE--A ONE LINE DESCRIPTION OF THE Y-AX
     &IS,'
     &/5X,'32 CHARACTERS MAXIMUM.')
 606   FORMAT (// 5X,'6. TYPE LETTERING--THE LETTER STYLE THAT YOU DESIRE
     & FOR THE VARIOUS'
     &/5X,'HEADINGS AND TITLES IN YOUR GRAPH.')
 607   FORMAT (// 5X,'7. MESSAGE STATEMENT--GIVES THE ABILITY TO ADD A SI
     &NGLE MESSAGE '
```

```
     &/5X,'STATEMENT OF 32 CHARACTERS MAXIMUM (I.E. SUBTITLE, FIGURE NO.
     &, ETC...)'
     &/5X,'ANYWHERE ON THE PAGE.')
 608  FORMAT (// 5X,'8. MESSAGE LOCATION CHANGE--ALLOWS YOU TO REVISE WH
     &ERE ON THE PAGE'
     &/5X,'YOU WISH THE MESSAGE LOCATED. THE LOCATION IS PINPOINTED USIN
     &G'/5X,'THE LOWER LEFT CORNER OF THE MESSAGE AS REFERENCE.')
 609  FORMAT (// 5X,'9. LEGEND LOCATION CHANGE--ALLOWS YOU TO DESIGNATE
     &WHERE ON THE GRAPH'
     &/5X,'YOU WISH THE LEGEND LOCATED. THE LOCATION IS PINPOINTED USING
     &'/5X,'THE LOWER LEFT CORNER OF THE LEGEND AS REFERENCE.'/)
 610  FORMAT (///5X,'10. X-AXIS SCALE--DETERMINES HOW THE X-AXIS IS TO B
     &E SET UP.'
     &/5X,'FOR A NORMAL AXIS: THE ORIGIN REFERS TO THE STARTING POINT.'
     &/5X,'THE STEP INTERVAL REFERS TO THE INCREMENT OF YOUR X VALUES.'
     &/5X,'THE MAXIMUM VALUE REFERS TO THE FINAL X VALUE.'
     &/5X,'FOR LOG SCALES: THE ORIGIN VALUE IS THE SMALLEST DECADE'
     &/5X,'AND THE INTERVAL IS THE LENGTH OF EACH DECADE.')
 611  FORMAT (// 5X,'11. Y-AXIS SCALE--DETERMINES HOW THE Y-AXIS IS TO B
     &E SET UP.'
     &/5X,'FOR A NORMAL AXIS: THE ORIGIN REFERS TO THE STARTING POINT.'
     &/5X,'THE STEP INTERVAL REFERS TO THE INCREMENT OF YOUR Y VALUES.'
     &/5X,'THE MAXIMUM VALUE REFERS TO THE FINAL Y VALUE.'
     &/5X,'FOR LOG SCALES: THE ORIGIN VALUE IS THE SMALLEST DECADE'
     &/5X,'AND THE INTERVAL IS THE LENGTH OF EACH DECADE.')
 612  FORMAT (// 5X,'12. GRID--THE EMPLACEMENT OF LINES ON THE GRAPH TO
     &MAKE IT MORE EASILY'
     &/5X,'READ.  YOU ARE ASKED THE NUMBER OF GRID LINES YOU WANT PER EA
     &CH'
     &/5X,'X AND Y STEP INTERVAL.')
 613  FORMAT (///5X,'13. CHANGE CURVES--ALLOWS YOU TO UPDATE ALL THE INF
     &ORMATION'
     &/5X,'THAT PERTAINS TO THE CURVE.')
 614  FORMAT (// 5X, '14. INPUT A COMPLETE NEW SET OF CURVES--THIS ALLOW
     &S YOU TO TAKE AN'
     &/5X,'OLD GRAPH AND INPUT A COMPLETE NEW SET OF CURVES. (CAUTION: TH
     &IS ERASES'
     &/5X,'THE OLD CURVES.) ')
 615  FORMAT (// 5X,'15. HELP--AN ATTEMPT TO CLEAR UP PROBLEMS, YOU MAY
     &WISH TO REFER'
     &/5X,'TO THE DISSPLA USER MANUAL.')
 616  FORMAT (// 5X,'16. PLOT THE UPDATED GRAPH--THIS REPLOTS THE GRAPH
     &YOU HAVE BEEN UPDATING.')
 617  FORMAT (// 5X,'17. NO CHANGES--ALLOWS YOU TO SAVE THIS GRAPH AND C
     &ONTINUE ON'
     &/5X,'TO EITHER DEVELOP A NEW GRAPH OR EXIT.'/////////)
      END
C*************************************************************************
C*************************************************************************
```

```
C**** HELP2                                                              ****
C****                                                                    ****
C****            HELP2 FIRST THREE-DIMENSIONAL MENU.                     ****
C****                                                                    ****
C************************************************************************
C************************************************************************
      SUBROUTINE HELP2
         CALL FRTCMS ('CLRSCRN ')
         CALL HELPEX
         WRITE (6,600)
         WRITE (6,601)
         WRITE (6,602)
         WRITE (6,603)
         WRITE (6,604)
         WRITE (6,605)
         WRITE (6,606)
         WRITE (6,607)
         WRITE (6,608)
         WRITE (6,609)
         WRITE (6,610)
         WRITE (6,611)
         WRITE (6,612)
         WRITE (6,613)
         WRITE (6,614)
         WRITE (6,615)
         WRITE (6,616)
         WRITE (6,617)
         WRITE (6,618)
10       RETURN
C
C   FORMAT STATEMENTS.
C
 510         FORMAT (I3)
 600         FORMAT (/25X,'**** HELP **** ')
 601  FORMAT (// 5X,'1. PAGE SIZE--THE PAGE DIMENSIONS THAT YOU WISH FOR
     &  YOUR GRAPH.')
 602  FORMAT (// 5X,'2. SUBPLOT AREA--THAT AREA OF THE PAGE YOU WISH TO
     &CONTAINED BY THE GRAPH,'
     &/5X,'ALLOWING FOR TITLES, BORDERS,ETC...')
 603  FORMAT (// 5X,'3. GRAPH TITLE--A ONE LINE GRAPH HEADING HAVING A M
     &AXIMUM LENGTH'
     &/5X,'OF 32 CHARACTERS.')
 604  FORMAT (// 5X,'4. X-AXIS TITLE--A ONE LINE DESCRIPTION OF THE X-AX
     &IS,'
     &/5X,'32 CHARACTERS MAXIMUM.')
 605  FORMAT (// 5X,'5. Y-AXIS TITLE--A ONE LINE DESCRIPTION OF THE Y-AX
     &IS,'
     &/5X,'32 CHARACTERS MAXIMUM.')
 606  FORMAT (// 5X,'6. Z-AXIS TITLE--A ONE LINE DESCRIPTION OF THE Z-AX
```

```
     &IS.'
     &/5X,'32 CHARACTERS MAXIMUM.')
607   FORMAT (// 5X,'7. MESSAGE STATEMENT--GIVES THE ABILITY TO ADD A SI
     &NGLE MESSAGE'
     &/5X,'STATEMENT OF 32 CHARACTERS MAXIMUM (I.E. SUBTITLE, FIGURE NO.
     &, ETC...)'
     &/5X,'ANYWHERE ON THE PAGE.')
608   FORMAT (// 5X,'8. MESSAGE LOCATION CHANGE--ALLOWS YOU TO REVISE WH
     &ERE ON THE PAGE'
     &/5X,'YOU WISH THE MESSAGE LOCATED. THE LOCATION IS PINPOINTED USIN
     &G'/5X,'THE LOWER LEFT CORNER OF THE MESSAGE AS REFERENCE.')
609   FORMAT (// 5X,'9. LEGEND LOCATION CHANGE--ALLOWS YOU TO DESIGNATE
     &WHERE ON THE GRAPH'
     &/5X,'YOU WISH THE LEGEND LOCATED. THE LOCATION IS PINPOINTED USING
     &'/5X,'THE LOWER LEFT CORNER OF THE LEGEND AS REFERENCE.'/)
610   FORMAT (//5X,'10. X-AXIS SCALE--DETERMINES HOW THE X-AXIS IS TO B
     &E SET UP.'
     &/5X,'FOR A NORMAL AXIS: THE ORIGIN REFERS TO THE STARTING POINT.'
     &/5X,'THE STEP INTERVAL REFERS TO THE INCREMENT OF YOUR X VALUES.'
     &/5X,'THE MAXIMUM VALUE REFERS TO THE FINAL X VALUE.')
611   FORMAT (// 5X,'11. Y-AXIS SCALE--DETERMINES HOW THE Y-AXIS IS TO B
     &E SET UP.'
     &/5X,'FOR A NORMAL AXIS: THE ORIGIN REFERS TO THE STARTING POINT.'
     &/5X,'THE STEP INTERVAL REFERS TO THE INCREMENT OF YOUR Y VALUES.'
     &/5X,'THE MAXIMUM VALUE REFERS TO THE FINAL Y VALUE.')
612   FORMAT (// 5X,'12. Z-AXIS SCALE--DETERMINES HOW THE Z-AXIS IS TO B
     &E SET UP.'
     &/5X,'FOR A NORMAL AXIS: THE ORIGIN REFERS TO THE STARTING POINT.'
     &/5X,'THE STEP INTERVAL REFERS TO THE INCREMENT OF YOUR Z VALUES.'
     &/5X,'THE MAXIMUM VALUE REFERS TO THE FINAL Z VALUE.')
613   FORMAT (// 5X,'13. GRID--THE EMPLACEMENT OF LINES ON THE GRAPH TO
     &MAKE IT MORE EASILY'
     &/5X,'READ.  YOU ARE ASKED THE NUMBER OF GRID LINES YOU WANT PER EA
     &CH'
     &/5X,'X, Y, AND Z STEP INTERVAL.')
614   FORMAT (//5X,'14. CHANGE CURVES--ALLOWS YOU TO UPDATE ALL THE INF
     &ORMATION'
     &/5X,'THAT PERTAINS TO THE CURVE.')
615   FORMAT (// 5X,'15. TYPE LETTERING--THE LETTER STYLE THAT YOU DESIR
     &E FOR THE VARIOUS'
     &/5X,'HEADINGS AND TITLES IN YOUR GRAPH.')
616   FORMAT (// 5X,'16. HELP--AN ATTEMPT TO CLEAR UP PROBLEMS, YOU MAY
     &WISH TO REFER'
     &/5X,'TO THE DISSPLA USER MANUAL.')
617   FORMAT (// 5X,'17. PLOT THE UPDATED GRAPH--THIS REPLOTS THE GRAPH
     &YOU HAVE BEEN UPDATING.')
618   FORMAT (// 5X,'18. NO CHANGES--ALLOWS YOU TO SAVE THIS GRAPH AND C
     &ONTINUE ON'
     &/5X,'TO EITHER DEVELOP A NEW GRAPH OR EXIT.'//////////////////)
```

```
      END
C*****************************************************************************
C*****************************************************************************
C**** HELP4                                                                 ****
C****                                                                       ****
C****      HELP4 FILE FOR THE PART THAT EDITS ALL OF THE CURVES.            ****
C****                                                                       ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE HELP4
         CALL FRTCMS ('CLRSCRN ')
         WRITE (6,600)
         WRITE (6,601)
         WRITE (6,602)
         WRITE (6,603)
         WRITE (6,604)
         WRITE (6,605)
10    RETURN
C
C   FORMAT STATEMENTS.
C
 510        FORMAT (I3)
 600        FORMAT (/25X,'**** HELP **** ')
 601  FORMAT (// 5X,'1. UPDATE AN EXISTING CURVE--ALLOWS YOU TO XEDIT EA
     &CH EXISTING'
     &/5X,'CURVE IN TURN.  THE CURVES ARE NUMBERED IN ORDER OF ENTRY.')
 602  FORMAT (// 5X,'2. ADD A CURVE--ALLOWS YOU TO INPUT AN ADDITIONAL C
     &URVE'
     &/5X,'TO THE LIST OF CURVES YOU HAVE ALREADY MADE.')
 603  FORMAT (// 5X,'3. DELETE A CURVE--DELETES AN EXISTING CURVE.')
 604  FORMAT (// 5X,'4. HELP--AN ATTEMPT TO CLEAR UP PROBLEMS, YOU MAY W
     &ISH TO REFER'
     &/5X,'TO THE DISSPLA USER MANUAL.')
 605  FORMAT (// 5X,'5. TERMINATE EDITING--TERMINATES THIS PHASE OF EDIT
     &ING AND ALLOWS YOU'
     &/5X,'TO CONTINUE EDITING OTHER ASPECTS OF THE CURVE.'//////////)
      END
C*****************************************************************************
C*****************************************************************************
C**** HELP5                                                                 ****
C****                                                                       ****
C****      HELP5 FILE FOR THE PART THAT EDITS THE CURVES.                   ****
C****                                                                       ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE HELP5
         CALL FRTCMS ('CLRSCRN ')
         WRITE (6,600)
         WRITE (6,601)
```

```
          WRITE (6,602)
          WRITE (6,603)
          WRITE (6,604)
          WRITE (6,605)
          WRITE (6,606)
          WRITE (6,607)
          WRITE (6,608)
          WRITE (6,609)
          WRITE (6,610)
10      RETURN
C
C    FORMAT STATEMENTS.
C
 510          FORMAT (I3)
 600          FORMAT (/25X,'**** HELP **** ')
 601   FORMAT (// 5X,'1. CURVE TITLE--A ONE LINE CURVE TITLE HAVING A MAX
     &IMUM LENGTH'
     &/5X,'OF 32 CHARACTERS.')
 602   FORMAT (// 5X,'2. CHECK DATA POINTS--CHECKS THE COORDINATES OF EAC
     &H '
     &/5X,'POINT OF DESIRED CURVE.')
 603   FORMAT (// 5X,'3. ADD A DATA POINT--ADDS A DATA POINT TO THE CURVE
     & DATA,'
     &/5X,'OF THE DESIRED CURVE.')
 604   FORMAT (// 5X,'4. DELETE A DATA POINT--DELETES A DATA POINT FROM T
     &THE CURVE,'
     &/5X,'DATA OF THE DESIRED CURVE.')
 605   FORMAT (// 5X,'5. CHANGE THE FILE NAME OF THE DATA POINTS-- CHANGE
     &S THE ENTIRE'
     &/5X,'CURVE DATA TO A NEW FILE OF DATA.')
 606   FORMAT (// 5X,'6. CHANGE THE NUMBER OF DATA POINTS TO BE MARKED--C
     &HANGES THE NUMBER'
     &/5X,'OF POINTS THAT WILL BE MARKED; A NEGATIVE NUMBER WILL PLOT ON
     &LY'/5X,'THE POINTS, NO CONNECTING LINES.')
 607   FORMAT (// 5X,'7. CHANGE THE LINE PATTERN TO BE DRAWN--CHANGES THE
     &LINE PATTERN USED'
     &/5X,'FOR THAT PARTICULAR CURVE.')
 608   FORMAT (// 5X,'8. CHANGE THE TYPE OF CURVE INTERPOLATION USED--CHA
     &NGES THE METHOD'
     &/5X,'USED IN DRAWING THE CONNECTING LINES BETWEEN DATA POINTS.')
 609   FORMAT (// 5X,'9. HELP--AN ATTEMPT TO CLEAR UP PROBLEMS, YOU MAYW
     &ISH TO REFER'
     &/5X,'TO THE DISSPLA USER MANUAL.')
 610   FORMAT (// 5X,'10. TERMINATE EDITING OF THIS CURVE--TERMINATES CNI
     &Y THIS EDITING PHASE'//////////)
       END
C*************************************************************************
C*************************************************************************
C****  HELPEX                                                         ****
```

```
C****                                                                  ****
C****       SUBROUTINE DISPLAYING AN EXAMPLE GRAPH TO HELP THE USER.   ****
C****                                                                  ****
C************************************************************************
C************************************************************************
C
C  DECLARATIONS.
C
      SUBROUTINE HELPEX
      INTEGER IP(600)
      REAL A(2),B(2),C(4),D(4),E(4),F(4)
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,ZPLOT(100), Z(18,100),JCOLOR(25)
      DATA A/0.5,3.0/, B/3.0,5.0/,C/3.5,4.5,5.5,6.5/,
     & D/1.5,2.5,3.5,4.5/, E/0.5,2.0,4.0,5.5/,F/0.5,2.0,4.0,5.5/
      CALL GRACE (2.0)
      CALL HWSCAL ('SCREEN')
      CALL PAGE (10.0,7.5)
      CALL AREA2D (7.0,4.0)
      CALL FRAME
      CALL SPISSL
      CALL SHDCHR(90.,1,.005,1)
      CALL THKFRM (.015)
      CALL THKCRV (.02)
      CALL XNAME ('X-AXIS NAME$',100)
      CALL YNAME ('Y-AXIS NAME$',100)
      CALL HEADIN ('GRAPH TITLE$',100,1.5,1)
      CALL MESSAG ('(MESSAGE)$',100,5.7,-.5)
      CALL LINES ('CURVE 1$',IP,1)
      CALL LINES ('CURVE 2$',IP,2)
      CALL LINES ('CURVE 3$',IP,3)
30    CALL YLOG (0.0,1.0,0.1,2.0)
      CALL LEGLIN
      CALL CURVE(A,B,2,0)
      CALL DASH
      CALL CURVE(E,F,4,1)
      CALL CURVE(C,D,4,-1)
      CALL LEGEND (IP,3,3.1,.8)
      CALL RLPEC (3.0,.7,1.5,1.,-2.0)
      CALL RESET('DASH')
      CALL MESSAG('PAGE X-AXIS LENGTH$',100,2.5,5.5)
      CALL RLVEC ( 2.4,63., -1.75,63.,2101)
      CALL RLVEC ( 4.7,63.,  8.195,63.,2101)
      CALL MESSAG('SUBPLOT X-AXIS LENGTH$',100,2.25, 5.0)
      CALL RLVEC ( 2.2,35., 0.0,35.,2101)
      CALL RLVEC ( 5.0,35., 7.0,35.,2101)
      CALL RLVEC ( 0.0,10., 0.0 ,50.,2100)
      CALL RLVEC ( 7.0,10.,  7.0,50.,2100)
```

```
      CALL MESSAG('LEGEND LOCATION$',100, .5, .8)
      CALL MESSAG('REFERENCE$',100, .5, .6)
      CALL BLREC ( .4,.5,2.0,.6,-2.0)
      CALL RLVEC ( 2.4,.30, 3.0,.22,2101)
      CALL MESSAG('MESSAGE LOCATION$',100,3.2,-1.0)
      CALL MESSAG('REFERENCE$',100,3.2,-1.2)
      CALL RLVEC ( 5.3,.04, 5.7,.056,2101)
      CALL MESSAG('STEP$',100,.25,-.60)
      CALL MESSAG('INTERVAL$',100,.05,- .8)
      CALL RLVEC ( 0.0,.1 ,0.0 ,.03,2100)
      CALL RLVEC ( 1.0,.10, 1.0 ,.03,2100)
      CALL MESSAG('ORIGIN$',100,-1.,- .6)
      CALL RLVEC ( -.3,.06, 0.0,.10,2101)
      CALL MESSAG('MAXIMUM$',100,7.1,- .6)
      CALL MESSAG('VALUE$',100,7.1,- .8)
      CALL RLVEC ( 7.3,.06, 7.0,0.1,2101)
      CALL ANGLE (90.)
      CALL MESSAG('PAGE Y-AXIS LENGTH$',100,-1.2,1.0)
      CALL RLVEC (-1.3,.3 ,-1.3,.016,2101)
      CALL RLVEC (-1.3,4.,-1.3,80.,2101)
      CALL MESSAG('SUBPLOT Y-AXIS LENGTH$',100,-.8, .8)
      CALL RLVEC (-.88,.22,-.880,.1,2101)
      CALL RLVEC (-.880,5.5,-.88,10.,2101)
      CALL RLVEC ( 0.0,.1,-1. ,.1,2100)
      CALL RLVEC ( 0.0,10.,-1.0,10.,2100)
      CALL ANGLE (270.)
      CALL MESSAG('CYCLE LENGTH$',100,7.3,1.72)
      CALL RLVEC ( 7.36,.8 , 7.36,1,2101)
      CALL RLVEC ( 7.36,.13, 7.36,.1,2101)
      CALL RLVEC ( 7.0, .1,8.00, .1,2100)
      CALL RLVEC (  7.,1., 8.0,1.,2100)
      CALL DOT
      CALL RESET('THKCRV')
      CALL GRID (1,1)
      CALL ENDPL (0)
      RETURN
      END
C*****************************************************************************
C*****************************************************************************
C**** ERROR1                                                              ****
C****                                                                      ****
C****                        ERROR MESSAGE 1                               ****
C****                                                                      ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE ERROR1
C
C  DECLARATIONS.
C
```

```
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100), LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,ZPLOT(100), Z(18,100), JCOLOR(25)
        CALL FRTCMS ('CLRSCRN ')
        WRITE (6,710) RELRAY(1,1)
      RETURN
C
C  FORMAT STATEMENTS.
C
 710      FORMAT (//20X,'**** ERROR ****'
     &/10X,'THE LENGTH FOR X MUST BE LESS THAN',F4.1,
     &/16X,'PLEASE REENTER')
      END
C*****************************************************************************
C*****************************************************************************
C****                                                                     ****
C****  ERROR2                                                             ****
C****                                                                     ****
C****                      ERROR MESSAGE 2                                ****
C****                                                                     ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE ERROR2
C
C  DECLARATIONS.
C
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
     &,X(18,100), Y(18,100), LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
     &,ZPLOT(100), Z(18,100), JCOLOR(25)
        CALL FRTCMS ('CLRSCRN ')
        WRITE (6,720) RELRAY(1,2)
      RETURN
C
C  FORMAT STATEMENTS.
C
 720      FORMAT (//20X,'**** ERROR ****'
     &/10X,'THE LENGTH FOR Y MUST BE LESS THAN',F4.1,
     &/16X,'PLEASE REENTER')
      END
C*****************************************************************************
C*****************************************************************************
C****                                                                     ****
C****  ERROR3                                                             ****
C****                                                                     ****
C****                      ERROR MESSAGE 3                                ****
C****                                                                     ****
C*****************************************************************************
C*****************************************************************************
      SUBROUTINE ERROR3
        CALL FRTCMS ('CLRSCRN ')
        WRITE (6,730)
```

```
      RETURN
C
C   FORMAT STATEMENTS.
C
 730        FORMAT (/25X,'**** ERROR **** '
     &/10X,'YOU HAVE ENTERED MORE THAN 32 CHARACTERS'
     &/16X,'PLEASE REENTER')
      END
C*****************************************************************
C*****************************************************************
C**** ERROR4                                                   ****
C****                                                          ****
C****                 ERROR MESSAGE 4                          ****
C****                                                          ****
C*****************************************************************
C*****************************************************************
      SUBROUTINE ERROR4 (LOW,IHIGH)
         CALL FRTCMS ('CLRSCRN ')
         WRITE (6,740) LOW, IHIGH
      RETURN
C
C  FORMAT STATEMENTS.
C
 740        FORMAT (/10X,'**** ERROR ****'
     &/10X,'YOUR ANSWER MUST BE FROM',I4,' TO',I4
     &/10X,'PLEASE REENTER.')
      END
C*****************************************************************
C*****************************************************************
C**** ERROR5                                                   ****
C****                                                          ****
C****                 ERROR MESSAGE 5                          ****
C****                                                          ****
C*****************************************************************
C*****************************************************************
      SUBROUTINE ERROR5
         CALL FRTCMS ('CLRSCRN ')
         WRITE (6,750)
      RETURN
C
C  FORMAT STATEMENTS.
C
 750        FORMAT (//10X,'**** ERROR ****'
     &/10X,'YOUR ANSWER MUST BE LESS THAN 100 POINTS'
     &/10X,'PLEASE REENTER.')
      END
C*****************************************************************
C*****************************************************************
C****  ERROR6                                                  ****
```

```
C****                                                                  ****
C****                    ERROR MESSAGE 6                               ****
C****                                                                  ****
C**********************************************************************
C**********************************************************************
      SUBROUTINE ERROR6
         CALL FRTCMS ('CLRSCRN ')
         WRITE (6,760)
      RETURN
C
C  FORMAT STATEMENTS.
C
 760      FORMAT (//10X,'**** ERROR ****'
     &/10X,'YOUR ANSWER MUST BE EITHER  Y OR N'
     &/10X,'PLEASE REENTER.')
      END
C**********************************************************************
C**********************************************************************
C****  ERROR7                                                          ****
C****                                                                  ****
C****                    ERROR MESSAGE 7                               ****
C****                                                                  ****
C**********************************************************************
C**********************************************************************
      SUBROUTINE ERROR7
         CALL FRTCMS ('CLRSCRN ')
         WRITE (6,770)
      RETURN
C
C  FORMAT STATEMENTS.
C
 770      FORMAT (//15X,'**** ERROR ****'
     &/10X,'YOU CAN ONLY PLOT A MAX OF 18 CURVES'
     &/10X,'YOUR ANSWER MUST BE 18 OR LESS'
     &/10X,'PLEASE REENTER.')
      END
C**********************************************************************
C**********************************************************************
C****  ERROR8                                                          ****
C****                                                                  ****
C****                    ERROR MESSAGE 8                               ****
C****                                                                  ****
C**********************************************************************
C**********************************************************************
      SUBROUTINE ERROR8
         REWIND 5
         CALL FRTCMS ('CLRSCRN ')
         WRITE (6,780)
      RETURN
```

```
C
C    FORMAT STATEMENTS.
C
 780          FORMAT (/25X,'**** ERROR **** '
     &/10X,'YOU MUST MAKE AN ENTRY THAT ANSWERS THE QUESTION'
     &/16X,'PLEASE REENTER')
       END
C*************************************************************************
C*************************************************************************
C****                                                                 ****
C****  EXIT1                                                          ****
C****                                                                 ****
C****          SUBROUTINE EXIT1 ALLOWS THE USER TO EXIT THE PROGRAM.  ****
C****                                                                 ****
C*************************************************************************
C*************************************************************************
       SUBROUTINE EXIT1
          CALL FRTCMS ('CLRSCRN ')
C
C  SUBROUTINE FILE FILES GRAPH DATA UNDER USER'S DEFINED FILE NAME.
C
          CALL FILE
          CALL DONEPL
       STOP
       END
*************************************************************************
*************************************************************************
****                                                                 ****
****                        EASYPLOT EXEC                            ****
****                                                                 ****
****  THIS EXEC LINKS TO THE PROPER USERID FOR EXECUTION OF THE      ****
****  PROGRAM.                                                       ****
****                                                                 ****
*************************************************************************
*************************************************************************
&CONTROL ERROR
EXEC IOGEVENT 1 EASYPLOT
GETFMADR
&READ VARS &STAR &MODE1 &CUU
CP LINK 0056P 191 &CUU RR
ACC &CUU &MODE1
EXEC EASY2652 &1
REL &MODE1 (DET
EXEC IOGEVENT 2 EASYPLOT
*************************************************************************
*************************************************************************
****                                                                 ****
****                        EASY2652 EXEC                            ****
****                                                                 ****
****  THIS EXEC EXECUTES THE PROGRAM FOR THE USER.                   ****
```

```
****                                                                  ****
****                                                                  ****
**********************************************************************
**********************************************************************
&TRACE OFF
CLRSCRN
VMSIZE
&IF &RC GE  960 &GOTO -FIRST
CLRSCRN
&PRINT **********************************************************************
&PRINT
&PRINT          YOU MUST FIRST HAVE 1024K TO RUN EASYPLOT
&PRINT            STORAGE HAS BEEN DEFINED FOR YOU.
&PRINT            TO CONTINUE, TYPE IN THE FOLLOWING:
&PRINT               I CMS                          (PRESS ENTER)
&PRINT               EASYPLOT                       (PRESS ENTER)
&PRINT
&PRINT **********************************************************************
CP DEFINE STORAGE 1M
CP TERMINAL LINES 80
-FIRST
GETFMADR
&READ VARS &STAR &MODE1 &CUU
CP LINK 0039P 191 &CUU RR
ACC &CUU &MODE1
GLOBAL TXTLIB CMSLIB FORTMOD2 MOD2EEH
SET LDRTBLS 6
VMSIZE
FILEDEF 11 DISK LBLANK TMP A3 (RECFM F LRECL 2400 BLKSIZE 2400 XTENT 600
FILEDEF 12 DISK ISSCOMAP MAPDTA * (RECFM F LRECL 400 BLKSIZE 400
FILEDEF 13 DISK TABLET TMP A3 (RECFM VS LRECL 208 BLKSIZE 208 XTENT 1000
FILEDEF 14 DISK LBLANK MAPDTA &LBMODE (RECFM VS LRECL 608 BLKSIZE 608
FILEDEF 17 DISK DISSPLA SYSUT1 A3 (RECFM FB LRECL 2000 BLOCK 2000 XTENT 500
FILEDEF 18 DISK DISSPLA METAFILE A4 (RECFM VBS LRECL 19065 BLOCK 19069
IOADMOD GRPH2652
START GRAPH
CLRSCRN
-SECOND
&PRINT **********************************************************************
&PRINT
&PRINT        DO YOU WANT A VRSTEC HARD COPY? (Y OR N)
&PRINT
&PRINT                        *** NOTE ****
&PRINT
&PRINT         1. THIS WILL REQUIRE BETWEEN 2% TO 20% OF YOUR A DISK
&PRINT            DEPENDING ON THE NUMBER OR SIZE OF YOUR GRAPH(S).
&PRINT
&PRINT         2. USE YOUR PROJECT NUMBER IF YOU HAVE ONE,
&PRINT            IF NOT, USE YOUR USERID NUMBER WITH NO "P".
```

```
&PRINT
&PRINT          3. USE YOUR GRAPHS WILL BE SENT TO THE COMPUTER CENTER
&PRINT             USING THE NAME "POP(USERID)"
&PRINT
&PRINT ************************************************************************
&READ VARS &ANS
&IF .&ANS EQ .Y &GOTO -THIRD
&IF .&ANS EQ .N &GOTO -FIFTH
CLRSCRN
&PRINT ************************************************************************
&PRINT
&PRINT        *** ERROR****  YOU MUST ANSWER Y(ES) OR N(O).
&PRINT
&PRINT ************************************************************************
&GOTO -SECOND
-THIRD
FILEDEF 11 DISK LBLANK TMP A3 (RECFM F LRECL 2400 BLKSIZE 2400 XTENT 600
FILEDEF 12 DISK ISSCCMAP MAPDTA * (RECFM F LRECL 400 BLKSIZE 400
FILEDEF 13 DISK TABLET TMP A3 (RECFM VS LRECL 208 BLKSIZE 208 XTENT 1000
FILEDEF 14 DISK LBLANK MAPDTA &LEMODE (RECFM VS LRECL 608 BLKSIZE 608
FILEDEF 17 DISK DISSPLA SYSUT1 A3 (RECFM FB LRECL 2000 BLOCK 2000 XTENT 500
FILEDEF 18 DISK DISSPLA METAFILE A4 (RECFM VBS LRECL 19065 BLOCK 19069
LOADMCD GRPH2652
START CPY
CLRSCRN
-FOURTH
EXEC DISSPCP VRSTEC
CLRSCRN
&PRINT
&PRINT
&PRINT
&PRINT
&PRINT ************************************************************************
&PRINT
&PRINT        YOUR GRAPH CAN BE PICKED UP AT THE COMPUTER CENTER
&PRINT             UNDER THE FOLLOWING NAME "POP(YOUR USERID)".
&PRINT
&PRINT ************************************************************************
-FIFTH
&EXIT &RC
&TRACE OFF
```

```
*************************************************************************
*************************************************************************
****                                                                 *****
****                      CHECK EXEC                                 *****
****                                                                 *****
****     THIS EXEC INSURES USER HAS A FILE ON HIS DISK.              *****
****                                                                 *****
****                                                                 *****
*************************************************************************
*************************************************************************
STATE &1 DATA
&STACK &RETCODE
&EXIT
```

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